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# THE AVAILABILITY OF FINANCING FOR NEW HIGH-TECHNOLOGY COMPANIES

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4. B 22/1:103-84

The Availability of Financing for N...

## HEARING BEFORE THE SUBCOMMITTEE ON ECONOMIC GROWTH AND CREDIT FORMATION OF THE COMMITTEE ON BANKING, FINANCE AND URBAN AFFAIRS HOUSE OF REPRESENTATIVES ONE HUNDRED THIRD CONGRESS FIRST SESSION

OCTOBER 26, 1993

Printed for the use of the Committee on Banking, Finance and Urban Affairs

**Serial No. 103-84**



INDEPENDENT OFFICE  
TECHNOLOGY

JUL 19 1994

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ISBN 0-16-044321-0



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# THE AVAILABILITY OF FINANCING FOR NEW HIGH-TECHNOLOGY COMPANIES

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TUESDAY, OCTOBER 26, 1993

HOUSE OF REPRESENTATIVES,  
SUBCOMMITTEE ON ECONOMIC GROWTH AND  
CREDIT FORMATION,  
COMMITTEE ON BANKING, FINANCE AND URBAN AFFAIRS,  
*Washington, DC.*

The subcommittee met, pursuant to call, at 2 p.m., in room 2222, Rayburn House Office Building, Hon. Paul E. Kanjorski [chairman of the subcommittee] presiding.

Present: Congressman Kanjorski, Representatives Klink and Fingerhut.

Chairman KANJORSKI. The subcommittee will come to order.

The subcommittee meets today for the second in a series of roundtable hearings on the potential for stimulating the economic growth and new job creation in the United States through Federal technology transfer and private sector commercialization. Today, we will be looking at the availability of financing for high-technology companies and entrepreneurs.

In searching for new initiatives to revitalize our economy and encourage new employment opportunities through the commercialization of federally held technologies, we must ensure that three key components are addressed. First, do America's small- and medium-sized businesses and entrepreneurs have access to available technologies? Two, do these businesses have access to technical expertise which may be necessary to successfully commercialize these technologies? And, third, do these businesses have access to capital necessary to successfully commercialize these technologies?

Today's hearing will focus primarily on the third issue, the availability of capital. Joining us are representatives of several small business and technology-related organizations involved in analysis of financing for technology transfer and economic conversion efforts.

I would like to thank all of the participants for taking time out of their busy schedules to meet with us and I welcome them to the subcommittee. As the witnesses are aware, I have some rather specific thoughts in this area and am developing legislation to facilitate the commercialization of federally held technologies. As such, I look forward to today's dialog.

We have, of course, five participants. First, we have Ms. Andrea Levere, program director, Corporation for Enterprise Development, Washington, DC; then we have Mr. Charles Ludlam, vice president for governmental affairs for Biotechnology Industry Organization,

Washington, DC; we have Peter McNeish, president, National Association of Small Business Investment Companies, Arlington, Virginia; Mr. Eric R. Pages, Director of Programs and the Defense Transitions Project, Business Executives for National Security, Washington, DC; and finally we have Mr. Milton D. Stewart, president, Small Business High-Technology Institute, vice chairman and chief counsel, Academy of Technology Entrepreneurs and Innovators, Phoenix, Arizona.

Welcome to you all. We have a rather informal process that we want to go through, really an open roundtable discussion so that when you are asked to give your testimony, if really you could summarize your testimony, we have had copies of it and we have the opportunity to put it in the record.

What we are looking for is an open discussion and we invite you to interrupt each other and members in that discussion when you have something to put in. Please do not just sit by. Make this as friendly and informal an occasion as we can. You have the information that we are looking for. We are trying to find out whether we are on the right track, the wrong track, or how we can change directions or adjust the direction that we are headed in.

I am pleased that we have two of our young members here today, and I am going to ask Mr. Fingerhut if he has an opening statement.

[The prepared statement of Mr. Kanjorski can be found in the appendix.]

Mr. FINGERHUT. I don't have any formal statement, in accordance with your request that this be an informal process. But I do want to commend you, Mr. Chairman, and this subcommittee for continuing to bring up what are the vital issues critical to this Nation's economy, and that is: How do we assure the entrepreneurs out there of the source of capital financing they need in order to create the jobs and make our economy grow?

I sometimes get frustrated and I know that my constituents are frustrated that we seem to talk all around the central issues. I wish that we could convince the networks and C-SPAN to cover this, because they would see that the Congress is dealing with the issues in the economy that are material to the country. I know that you have an initiative in legislation that you are developing surrounding these issues. I think that is a very important step forward that this Congress can take.

Chairman KANJORSKI. Thank you. And my good friend from Pennsylvania, Mr. Klink.

Mr. KLINK. I associate myself with the statements by Mr. Fingerhut. I am anxious for the hearing to begin.

Chairman KANJORSKI. We are going to start and move across from my left. Mr. Stewart, you will be first.

**STATEMENT OF MILTON D. STEWART, PRESIDENT, SMALL BUSINESS HIGH-TECHNOLOGY INSTITUTE; VICE CHAIRMAN AND CHIEF COUNSEL, ACADEMY OF TECHNOLOGY ENTREPRENEURS AND INNOVATORS**

Mr. STEWART. Thank you, Mr. Chairman.

I would like to say we appreciate very much the fact that you have cast the issue in a way that goes beyond banking and reaches



the technology cross-section, as it were, of issues that in other ways are the business of perhaps a dozen committees of the House, and a dozen of the Senate.

This is an absolutely essential beginning to try to pull together the legislative threads that bear on this crucial problem. I have quoted from Simon Ramo, who 5 years ago in a book called "The Business of Science," despite the fact that he is the epitome, if you will, of a large company, large university, large government projects person, specifically comes down hard and says, is there a natural strategy to achieve superiority in technology? I am certain there is. It is to foster technology entrepreneurship. And later, an abundance of new companies is needed to advance the new technologies, and finally, we can help entrepreneurs find sources of capital.

I have addressed several things that I have called needs and have made several suggestions about how to meet them. I should say that in my present capacities, I spend most of my days and nights with technology entrepreneurs, talking to them about things that trouble them. And among them is, of course, the ever present problem of capital and credit.

I have given you, in an appendix, a letter which is three pages from the incoming president of the Academy of Technology Entrepreneurs and Innovators, a very successful man in technology terms, has won over \$7 million in Federal SBIR awards, and 60 days ago was given 60 days by his bank to take his business elsewhere when he asked them for an expanded line of credit. And I think you will find his letter of great interest.

The first suggestion I have for meeting the needs of technology companies is for the SBA to establish a pilot program under its 7(a) authority of guaranteed loans for technology-based businesses. I don't even think that takes legislation. A congressional nudge might be a good thing. They are pretty busy people. But that is a beginning of educating technologically illiterate bank loan officers as to how to do this business. If the SBA shares the guarantee, it is some comfort to them to take the unknown risks of dealing with technology-based companies.

I will rip through all of this, as you requested, and come back to any you want to talk further about.

On secondary markets, I was delighted, as I am sure you were, to read in the *Wall Street Journal* last week about a successful offering to the secondary market of bank nonguaranteed loans. If this takes hold, and I think your proposal for licensing facilitators will help it take hold, it is part of the ultimate answer to this problem, which in my own opinion has to be a private sector answer.

Third, an off-the-wall suggestion, if you will, again to help banks learn how to live in modern technology-based times. We keep looking for new missions for the Federal laboratories which are brilliant in the work they do and it seems that we might experiment with establishing a technology advisory service from the Federal laboratories to the banks that might ultimately become privatized. They are a great resource, which I think can use some more homework.

Chairman KANJORSKI. In the nature that when bankers aren't familiar with the technology they are asked to fund, they could go to the advisory service?

Mr. STEWART. Right. They would not be asking "Should we make the loan?" but, "What do you know about this technology and this market?" All of the things they worry about now.

And finally on the banks, clearly the regulators I think ought to be encouraging—I was pleased to read Mr. Greenspan welcomed the secondary capital market, but also the regulators have to press banks into networks with SBICs and ask them to answer questions about why don't you have an SBIC in which you invest? Why isn't it good for your stockholders? Plenty of banks have established that it makes good sense as an adjunct to their banking business.

Third, we need more individual investment obviously in equity of small companies in general, and particularly high-technology companies. A man about whom I hope you will know, Bill Wetzel, is a professor at the University of New Hampshire, and he has done the work on the investment capital and his estimate is that there is \$30 billion a year available from individuals if they can be linked to entrepreneurs. And he works at the mechanical problem of linkage.

I think in view of the historic gain we have made with the capital gains tax, this is a great time for the Federal Government to undertake an information program. I come from middle America in Phoenix. People do not yet know about the advantage that long-term investment in small companies will have over the normal capital gains tax, and I really think both the executive branch and the Congress should commend themselves to see to it that this is understood quickly.

The biggest problem we will have is that the D-day, so to speak, is 5 years from now. It would have been better if we could have provided a rollover or reinvestment contract so that if I sold a major company's securities today and reinvested it in a small company tomorrow I would not pay a tax, it would be replaced in the new base of the holding, but I would have 5 years in which to hold it in the small company. I think that is a critical nexus and Charles knows much more about it than I do.

Mr. FINGERHUT. Can you repeat that?

Mr. STEWART. The rollover or reinvestment idea would enable me as a stockholder in a major company who is now prepared to take a risk because the government has turned a green light on risk taking by giving me a lower rate of capital gains to pay and I want to do that. To do it now under the present law, I have to sell my stock, invest in a small company, and start a 5-year holding period.

Chairman KANJORSKI. And as you sell your stock, you would pay capital gains on it. Somewhat like eminent domain, involuntary conversion. You have a period.

Mr. FINGERHUT. So you wouldn't be required to pay tax on any sales of stock that you roll over into a new qualified technology?

Mr. STEWART. And this puts the effect of the law right up front where now if you are in the money business it is something down the road 5 years and you are not inclined to hurry up into it.

Chairman KANJORSKI. So there is a tremendous pool of capital out there.

Mr. FINGERHUT. Has CBO done any estimates on that, by chance?

Chairman KANJORSKI. This is a Stewart original now.

Mr. STEWART. It is nothing but an analog to what happened if you hold a house and sell it.

Mr. FINGERHUT. I wonder if through the subcommittee and the subcommittee offices that we might get a cost estimate on that.

Chairman KANJORSKI. We will pose the question and get the tax consequences of that.

But that is a tremendous—you know, maybe, Mr. Stewart, if we combine that with doing it through an organized venture such as a secondary market, if they buy secondary market securities they get the rollover that forces a tremendous pool.

Mr. LUDLAM. We do have an estimate on the cost of the rollover provision. I was the author of the capital gains tax incentive and we did get estimates on quite a few variations of the bill. The rollover provision could be designed in two ways. You could say that if you roll over what otherwise would have been a qualified investment in a small company with less than \$50 million in capitalization into another qualified investment, that would cost about \$100 million over 5 years. If you said that anybody could roll over any capital gains from a large company or a house or any other investment, it would cost more than that.

Chairman KANJORSKI. But how much more?

Mr. LUDLAM. \$200 million or \$300 million.

Chairman KANJORSKI. What kind of pool of capital would that create, if you recall?

Mr. LUDLAM. The issue here was that this is a form of retroactivity. The incentive, as adopted, is prospective only. Only new investments made after the date that the bill was enacted are covered. And so that was a basic principle.

Chairman KANJORSKI. How about if we went back to previously acquired assets.

Mr. MCNEISH. There is a provision for the specialized subset of SBIC. There is a rollover.

Chairman KANJORSKI. But they have to go into SBICs.

Mr. MCNEISH. But that has created an enormous ground swell of capital sources looking for places in which to shelter money.

Chairman KANJORSKI. If you owned a long-term company and you recently sold out in a merger and you got a pool of \$50 or \$100 million, normally now you would be subject to capital gains of 28 percent. But if you took that \$28 million that would be the tax—

Mr. MCNEISH. No, there are limitations on it.

Mr. LUDLAM. \$10 million per taxpayer bill or 10 times the basis of the investment, whichever is greater.

Chairman KANJORSKI. So you could take that money and funnel it into a specialized SBIC.

Mr. MCNEISH. That invests primarily in minority-owned businesses.

Chairman KANJORSKI. How about technology companies?

Mr. MCNEISH. They could be technology companies.

Chairman KANJORSKI. But they have to be minority-owned?

Mr. MCNEISH. That is right.



Mr. STEWART. In terms of estimating the impact on the capital markets, you would have to be courageous to do it but that has never stopped me yet, and as far as I am concerned, \$10 billion a year is a reasonable order of magnitude of level that you are talking about because you are not churning the market in a foolish way. You are doing it for a constructive purpose. You are providing an easy way to shift from long-term liquid securities to long-term holding in illiquid securities and you are overcoming the biggest beef that the holder has; he is going to have to pay taxes when he makes the change.

Chairman KANJORSKI. So really what we are doing is participating as part of the government by foregoing our taxes by allowing private ownership to let it shift in.

Mr. STEWART. Next, I have done a computation using National Science Foundation numbers to find out—you are asking often about is the government doing enough and so forth—I looked at the procurement of R&D by government and the private sector; 10 years. The government over a 10-year period bought R&D from its industry application of R&D funds to the level of about 3 percent year by year.

The table is in the appendix. If you take the private sector, much more competitive and tougher, the private sector used small companies to the tune of 9 percent on average. So the government is one-third as courageous and one-third as interested in encouraging initiatives as the private sector, which I am sure surprises none of us who have been in it.

But, nonetheless, what I think we have come up with for the first time is a yardstick, which will satisfy me as an old small business advocate, if the government puts 9 percent agency-by-agency into small high-technology companies then I am prepared to say it is doing enough to stimulate initiative. Until the private sector changes that ratio very sharply, I would say that is good enough. And I made the shortfall between 3 and 9 percent, \$17 billion over a 10-year period. And let me tell you if that money had gone into small high-tech companies, it would have made an enormous difference to them and not a very big difference to the large companies.

Chairman KANJORSKI. We have to take a break because we have to run over to vote and we will come right back.

[Brief recess.]

Chairman KANJORSKI. Mr. Stewart, you were in the middle of something.

Mr. STEWART. Just three quick points, Mr. Chairman. What I was talking about was the desirability of using objective yardsticks to answer the question of when is how much procurement enough? And if you take a look at the private sector and the role that small companies, technology-based, play in it and you take a look at the role that they play in Federal procurement, it is clear that the Federal Government lags the private sector in the use of the companies that produce more innovation in technology and the economy than any others.

And as I was saying, the difference in the adjustment would not be very significant for large companies, 3 percent of \$238 billion—

6 percent—but it would be very significant for small companies. It would have meant \$17 billion in the last 10 years.

Next, we have done everything we could, and continue to, to make successful the Federal SBIR Program. And we think it is probably the best road the Federal Government has taken yet. One of the unlicked problems in it is phase 3, which is working, but not quickly enough and not well enough. And I have two suggestions in here about how to make it work better.

In the private sector, I think if we gave large companies a small tax incentive, maybe a premium on the R&D tax credit, make it 20 percent more, all SBIR projects by definition are in the public interest. Every topic in them is chosen in the Health Department, the Defense Department, the Energy Department, whatever it is, it is chosen because it has got a public purpose. And that would justify I think another—

Chairman KANJORSKI. What would that take the rate up to at 20 percent more?

Mr. STEWART. Forty percent. Now it is 40 percent of the increase in R&D expenditures. In other words, what the company takes as a credit is the difference between what it spent in the 5-year basis period and what it spent last year. I don't think it would be a lot of money. Chuck probably has better judgment than I do. But it is the kind of thing—what I like about it is that it means that every comptroller in a major company will be kicking his operating people to find us some SBIR deals for us to get into it. And that is what we need, something to get them to focus on it.

I suggested also that the other kind of commercialization Congress directed was ending up in the Federal marketplace. And here I am not sold yet that there is enough linkage between the topic pickers and the Federal buyers. In other words, some subjects are put in the SBIR solicitations we are told in anticipation of Federal purchase after the work is done. And it seems to us that somebody ought to be measuring the output and seeing how much of it really works and whether they are collaborating in choosing the topic or not. We often think they are not.

Finally, it is like seeing a bad movie for the second time. One of the most upsetting developments in Federal procurement is so-called cost sharing. The idea here is if I have a 5,000 employee business and you employ 5 people and we are both interested in the same piece of business in the Commerce Department's Advanced Technology Program, we are equally free to put up half the cost, if you follow me. And that kind of economy went out with the bustle.

There is no equality there at all. It is a sign hanging on the program that says, small business need not apply. That is really what it does. It is spreading in the Federal Government. It is now in at least five regions and so far as we are concerned we need general government across-the-board legislation.

We will be talking with Mr. LaFalce, one of your colleagues, who is the chairman of Small Business, because we think this will take an amendment of the Small Business Act. It is that fundamental an issue, how you treat small business fairly.

I have not directly answered your questions, Mr. Chairman. I will be glad to try later on, if you like. But essentially, what I think

you have done that is very important is to, in effect, illustrate that procurement, taxes, regulation, and banking, all of them have to be taken into account when you are looking at capital formation.

Absolutely last point. We did a survey of SBIR winners. Three hundred of them answered our questionnaire, and we asked them, did the SBIR Program have anything to do with the founding of your company? Nothing; it was partially responsible for the founding of our company; it was wholly responsible. Eight percent said it was wholly responsible. Seventeen percent said it was partially responsible. That means one out of four companies was moved to organize and capitalize in the private sector because of the prospect of being able to compete successfully for Federal technology entrepreneurial dollars. To me, that is proof positive that what we are talking about are the right things to talk about. Thank you very much.

[The prepared statement of Mr. Stewart can be found in the appendix.]

Chairman KANJORSKI. Thank you very much, Mr. Stewart.  
Mr. Ludlam.

#### **STATEMENT OF CHARLES LUDLAM, VICE PRESIDENT FOR GOVERNMENTAL AFFAIRS, BIOTECHNOLOGY INDUSTRY OR- GANIZATION**

Mr. LUDLAM. Thank you, Mr. Chairman. It is an honor to be on the same panel with Milt Stewart. He is the dean of the entrepreneurial advocates in the United States and I am not sure I would be here if he had not led the way. So it is an honor to be here with him.

I am representing the biotechnology industry, which is, I think, a unique industry particularly as it concerns capital formation. There is probably no industry in the United States that is more capital intensive and is more interested in capital formation issues.

Some of the statistics in the testimony that I think are striking are that as a per employee basis, 7 of the top 10 firms in the United States in terms of R&D per employee are biotech firms, including the top 4. We have one firm that is spending \$178,000 per employee on research. The all-industry average is \$7,000.

As a percentage of sales, the top six firms in the United States in terms of R&D as a percentage of sales are all biotech firms. Centocor has 124 percent as the ratio of R&D to sales. The U.S. industry average is 3.7 percent. That is not a misstatement. It is 3.7 percent as compared to 124 percent.

Our firms have to raise \$395 million to fund the first new chemical entity that they can get approved by FDA to take it to market. That is the first new revenue that they will get. Biotechnology is 7 to 10 times as expensive as semiconductor chips, the second most R&D intensive.

We have 225 public, 1,000 nonpublic biotechnology companies. This is an industry that didn't exist 15 years ago. The industry is not able to raise money from banks. Banks cannot lend to a firm that has no revenues and no prospect of revenues for the next 5 or 10 years.



We can talk about tax incentives. I have five or six suggestions on the targeted capital gains incentive if you would like to pursue that issue and I also have suggestions on the R&D tax credit.

But let me emphasize that there is nothing that you can do to banking legislation or tax legislation or on SBIC legislation or any other issue that is more important to us than not poisoning our capital markets in terms of the health care reform debate. That is the single most important thing.

If the government simply lets the markets operate, we can raise the capital, staggering though the amounts may be. The prospect of price controls in the health care debate has led our capital markets to drop 25 percent in terms of the publicly traded companies, in terms of the valuation in the market. There are a variety of causes to be sure for this drop. It is not only the health care debate. These are speculative stocks and controversial products.

But there are only two things that we can do in the public policy arena and that you can do as Members of Congress that will directly affect those markets, and those deal with price controls in the health care reform debate and in the implementation of the CRADA agreements.

I suggest that we focus on what we can control and not on market conditions that we cannot control. There is a public perception, I think, that there are no price controls in the Clinton draft plan. And we, obviously, don't have the final plan. We assume it will come out tomorrow. But in the draft plan, there are price controls on the one sector of the entire \$800 billion health care economy, and that is breakthrough drugs.

For every other sector of the entire Health Care bill, the bill relies on managed competition and global budgets to restrain costs. They have singled out only one technology, only one sector for separate price controls, and that is on breakthrough drugs. In other words, it is a plan that targets technology innovation. It is clear that our investors understand this. And what they understand in terms of the impact on their investments is critical in the end.

We see that when the investors invest in a company, they invest typically in a portfolio of 9 or 10 biotechnology stocks hoping that one will be a gusher. They know that they are going to lose their principal on some investments and get no return on others. But now they can see in the draft plan that if they have a company that has a breakthrough drug that that company will be flogged in public if the bureaucrat doesn't like their prices, they can be blacklisted under Medicare; and then if they get through all of that, they have to give the government a 15-percent discount on the price based upon the new managed competition price which presumably would be lower.

We basically view the plan as favoring cost and coverage at the expense of research. The crunch time is coming for biotechnology firms. Fifty-eight percent of our firms have 2 years or less in cash. They are raising capital at one-fourth of the rate they are burning capital. This is obviously unsustainable. By and large, they have no revenues to sustain them during the downturn. Their sole source of revenue is equity capital.

The biotechnology industry is the paradigm of the high-tech firm which relies on research and brains to compete. It is interesting to

compare the industrial policy that we see in the draft health care plan with the industrial policy in Japan. Japan sets drug prices. They provide a premium on breakthrough drug prices because they want to encourage the growth of their biotechnology industry.

The human growth hormone price in the United States is \$14. It is \$53 in Japan. The G-CSF price in the United States is \$112 and \$375 in Japan. The EPO price in the United States is \$40. The price in Japan is \$99. The price on alpha interferon in the United States is \$8.75, and in Japan it is \$25. That is an industrial policy in Japan favoring technology and favoring growth and research.

So I will conclude by saying that this is an industry that has incredible potential in terms of economic growth and jobs. It has staggering potential in terms of cures and therapies for AIDS, Alzheimers, cystic fibrosis, MS, cancer.

There are approximately 5,000 genetically transmitted diseases and hundreds more that are susceptible to treatment by recombinant DNA.

This is an industry that, if the government lets it raise the capital in the private market, will thrive. We are totally dominant in international markets at the current time. We are facing the situation where this industry will be crushed by health care price controls.

[The prepared statement of Mr. Ludlam can be found in the appendix.]

Chairman KANJORSKI. As you know, this subcommittee has jurisdiction over price controls, so we will be facing that issue sometime in the future. We look forward to your input. You keep us aware of it.

In your testimony, you discuss CRADAs and you think there is a problem there.

Mr. LUDLAM. It is a related problem, implementation of CRADAs by NIH. The government licenses its patents on a technology. They license the technology to a private company. They don't develop it themselves. They license it to a private company to develop it.

In the licensing agreement, they require that the government review the prices of the product that might be developed from the license and determine what is a reasonable price on a product. It is another form of price controls.

What it means, as a practical matter, is that many of our companies will no longer do CRADAs because, under a licensing agreement, they are the ones that put up the private money to develop the product and go through the 5 or 6 or 7 years at FDA to clear the product.

And in many of these cases, the technology doesn't prove to be valuable or FDA does not approve it or whatever. If, after putting all of that money up front on research, they are going to face price controls at the end, this means that the money isn't there for the investors and the company can't raise it and the company is not likely to develop the technology.

This undermines the whole Technology Transfer Program at NIH.

Chairman KANJORSKI. Is that price provision statutory or regulatory?

Mr. LUDLAM. It is basically regulatory, but there is a statutory reg.

Chairman KANJORSKI. What particular statute?

Mr. LUDLAM. There were amendments to the—I am not sure exactly which bill it was. There were amendments, I think, in 1987 or 1988.

It arose in a controversy over the prices for AZT. And AZT was not based on CRADA-licensed. But the NIH felt pressure in terms of price of that drug.

There will always be drugs that have a controversial price.

Chairman KANJORSKI. That was sort of a stupid deal though, was it not? We actually spent all of the research and development money, as I understand it, in the Federal Government. And then we gave the license away for next to nothing and did not control the price.

Mr. LUDLAM. The whole issue—the government has an interest, obviously, in reasonable prices. We all do. We all want something for nothing. We all want it at a reasonable price, and we want access for everybody.

Chairman KANJORSKI. Would it not have been better if the government had taken a capital interest in the company that was going to do it as its payment and share back the profit?

Mr. LUDLAM. BIO does not have a position on the question of equity ownership interest on the part of government. I believe it is addressed in some of the other testimony you will hear. And I don't think we are able to comment on that proposal at this time.

Chairman KANJORSKI. Mr. Pages.

**STATEMENT OF ERIK R. PAGES, DIRECTOR OF PROGRAMS AND THE DEFENSE TRANSITIONS PROJECT, BUSINESS EXECUTIVES FOR NATIONAL SECURITY [BENS]**

Mr. PAGES. Thank you, Mr. Chairman. I want to thank you for inviting me back again to appear before you.

I am here representing Business Executives for National Security, which is a national nonpartisan association of 1,500 business leaders. And we are interested in today's debate because of our interest in supporting defense diversification among businesses.

And in our perspective, the steps that we take to improve financing for all high-technology companies will do a lot to promote defense conversion as well. We have done a lot of work in studying the defense diversification of firms. And the findings that we have reached are almost 100 percent consistent.

Our work, and the work of various State-level surveys, including work in your home State of Pennsylvania have found that the number one problem is that companies cannot get access to capital to retool and enter commercial markets. And this is a big problem that affects all small businesses.

Chairman KANJORSKI. Would you drop a letter to Mr. Cutter at the White House to that effect?

Mr. PAGES. I would be happy to do that, sir.

As you know, the causes of this problem are economywide, but they have been particularly acute for defense firms.

Banks and investment and venture capital firms have been quite wary of investing in defense firms. First off, they are very pessimis-



tic about the possibilities of defense conversion; and also many of them don't understand the defense business.

It is somewhat different from a number of other high-tech sectors. That has been a major factor in the credit crunch as it affects companies that are trying to convert. I know of a number of cases where companies have succeeded in converting and have been unable to get loans to fulfill commercial contracts and have had to give up on commercial contracts because of that.

And this is difficult for defense firms because they rely on progress payments when they do business with the Department of Defense. And progress payments do not exist in commercial business. You are paid on completion of a contract.

So what happens for defense firms is that, as they begin to enter commercial markets, this demand for capital increases, exactly at the same time when they have the most difficulty in getting access to capital. So that has really been a major problem for firms trying to diversify into commercial businesses. The government programs that exist today really do not tackle this problem.

The Clinton administration's Technology Reinvestment Project does not address financing. It provides additional funding for dual use R&D, a service that most small firms don't need. In fact, you see surveys of—State-level surveys, that is normally at the bottom of the list in terms of services required by smaller and medium-sized defense firms.

So what would I suggest we do to remedy this situation? We have a number of specific recommendations.

First, I would suggest that we create a new program under the Technology Reinvestment Project what we call the Business Development Program.

The current programs do a decent job in terms of supporting technology transfer and manufacturing extension services, but they do not do a lot in the area of financing or in the area of training of entrepreneurship, management training, those types of activities.

We would need to do more in that area. There are a number of model programs, including Ohio's Edison programs, Pennsylvania's Ben Franklin partnerships. We need some sort of funding under the TRP that would support these business development activities.

The second thing I would suggest is possibly the use of tax incentives, such as Mr. Stewart has suggested, to encourage larger defense funds to donate plants, donate space, or transfer technologies to some of the smaller firms. We talked about the Grumman Ventures Program. That is a rarity. There are not a whole lot of larger firms that are involved in that sort of activity.

The Federal Government is not the only holder of innovative technologies. Large companies also hold them, and especially those in the defense business.

And, finally, I suggest that we support the fund for defense conversion. This would probably work similar to the SBIC Program. We had originally viewed this as creating an entity similar to Fannie Mae or Reconstruction Financing Corp.

After having examined the issue, we feel it would be much more effective to operate this in a manner similar to the SBIC. And there are a few venture capital outfits out there that have experience in the defense sector and are willing to invest in the defense



diversification projects. And these investors may be a model for the type of people that we may be able to qualify. Basically, these entities address the financing issues head on.

And this is the major problem and is the area that has received the least amount of attention here in Washington.

Chairman KANJORSKI. Could you elaborate on that financing? Or do you have any paperwork?

Mr. PAGES. I would be happy to submit that for the record. We have a summary of the proposal. That is concluding my remarks.

Thank you.

[The prepared statement of Mr. Erik Pages can be found in the appendix.]

Chairman KANJORSKI. And Ms. Levere.

#### **STATEMENT OF ANDREA LEVERE, PROGRAM DIRECTOR, CORPORATION FOR ENTERPRISE DEVELOPMENT**

Ms. LEVERE. Thank you, Mr. Chairman and members of the subcommittee. I work with the Corporation for Enterprise Development. And I think, in contrast, I represent no specific industry. Our experience and background in this is twofold. One you may be familiar with.

Every year we publish the Development Report Card for the States which looks at the economy of all of the different States and compares them—

Chairman KANJORSKI. Could we get a copy of that for the subcommittee?

Ms. LEVERE. Right.

[The Development Report Card for the States can be seen at the office of the Subcommittee on Economic Growth and Credit Formation, Room 109, Ford House Office Building, Washington, DC.]

Fifty different economic indicators. A significant number of those look at the technology programs and technology resources that are available and how it directly affects the business viability and business capacity of the States.

The other piece of what we do is direct on-site work with the States designing programs to enhance the competitiveness of their local economies. And we have done extensive work in both Pennsylvania and Ohio.

What I have decided to do is step back and say, if we were to design a program to finance technology-related businesses, what are the five things we have learned doing this for 15 years that would make the program work?

The first piece that I wanted to say is that, while we look at the capital markets as international and global, but identifying the technology gaps, it is a local phenomenon and for a number of reasons. Now Federal economic financing programs administrator—are different if you are in Utah or in Pennsylvania, how they make loans. We do extensive audits of banking practices.

States all over the country ask us to audit how they do business loans and find tremendous differences on a State-by-State basis of how this happens. We look in terms of what are the resources available, compare the State of Pennsylvania and what they offer to the State of Idaho, which has one State-funded financing program for small business so you can see what the disparity is.

One of the key ingredients of any Federal initiative has to be that it has the flexibility at the local level to meet the specific credit gaps of the technology-related businesses, and that it is administered that way jointly.

Point number two, which, as we have seen all over the country in these programs, is that you can't address credit needs without addressing capacity. There has to be customized, intensive, and long-term technical assistance for these businesses before, during, and after you provide the actual financing.

One of the mistakes that a lot of the State programs have made—and we have just been involved in Oregon analyzing the effectiveness of a competitiveness venture—the wood products competitiveness venture, which revitalized the wood products industry and the timeframe that these programs have is much too short, the kind of assistance that the programs need over time.

I think one of the very important structuring issues for this would be that, as you design any financing program, there has to be incentives to tie it to the delivery systems that exist at the State and local level already so that you would have it tied directly to the infrastructure that the Ben Franklin partnership has developed to enhance the impact of that financing.

Number three; one of the issues that you raise is, do we need to think about consolidating the different Federal initiatives and how they are implemented?

Obviously, anybody who has paid attention to the reinventing government and the rationality of that, it makes sense; but we have to do it at the local level. We have just done a 9-month study commissioned by the Pennsylvania Department of Commerce of how to completely reorganize the local economic development delivery system.

The fact that when an entrepreneur first enters the system, it is the local person they talk to first and the local person that helps to navigate them through the morass of the State and Federal resources. And if that local person is not good, that business' opportunities are very much constrained. And a piece of that is that we have to look at coordinating the resources on a local level through the use of Federal incentives to do that at the same time we do that at the State level.

Point four—and I think Chuck talked about—that does it make sense for the Federal Government to have an equity stake in privately held businesses? Another area where we have been involved is the design of publicly funded venture capital programs which has been working for about 10 years now.

We have found a fundamental contradiction in having the public sector own pure equity. And the reason for that is, when venture capitalists invest in a business, they don't have collateral or security in any sense of the word. The ultimate security is control, which means they can walk in if the business is not working the way it is supposed to and take it over and manage it.

In no context that we have seen is it available for the public to walk in and manage privately held business.

Chairman KANJORSKI. You could do that by having a convertible bond.

Ms. LEVERE. We could look at a different financing instrument.

Chairman KANJORSKI. The interest that I am suggesting is there in that we are trying to get technology out at a cheap cost, without requiring a licensing fee or a patent buyout situation, which would eat up a lot of capital on the front part. It would be much better if the government, to be an interest in the business and have the intent to watch it from a technical assistance necessity, over its future course, but that it not be a participant in the management of the business, as if the business succeeds to a great extent, it gets a payback on the patent. If it does not succeed, it has the ability to take the patent back and reassign it in the future.

Ms. LEVERE. There are many ways to work to get some upside in the future and have that investment over the long term.

The fifth point that I would like to make is that this type of economic development financing and small business financing is different from what we have done in the past. And one of the evaluators that is used is job creation.

And I know that there are powerful statistics about job creation. But it happens differently in this industry. And in Pennsylvania, we may lose jobs in the short term to save jobs in the long term. And we have to look at benchmarks that specify what are the other benefits that come from this investment so that we can track in a different way.

And those are my major points; thank you.

[The prepared statement of Ms. Levere can be found in the appendix.]

Chairman KANJORSKI. Mr. McNeish.

**STATEMENT OF PETER F. McNEISH, PRESIDENT, NATIONAL ASSOCIATION OF SMALL BUSINESS INVESTMENT COMPANIES [NASBIC]**

Mr. McNEISH. Thank you, Mr. Chairman. Pleasure to be here, members of the subcommittee. I feel very much at home as a Pittsburgh native.

Mr. FINGERHUT. It wasn't a bad game this weekend, was it?

Mr. McNEISH. Let me summarize my testimony as briefly as I can by saying that first of all SBICs are probably one of the best examples of a private-government partnership that does work.

SBICs are privately owned, privately capitalized companies. They are high-risk investment companies. They are licensed by the SBA, regulated by the SBA, and with SBA's guarantee authority, they have access to the capital markets for additional funds.

Chairman KANJORSKI. What portion is that since the amendments?

Mr. McNEISH. As high as three to one. But using the securities, it is two to one. If it was organized at \$10 million private, it could have additional \$30 million by the government system.

The genius of that, of course, is that the private capital in any investments it makes is at risk first. That forces those investment decisions to be risk driven by the investment managers. And they have got their own private investors looking over their shoulders all the time. There is a leverage that the government gets through that system and process. And the system has worked extremely well.



Historically, the SBIC industry has invested 20 to 25 percent of total portfolio investments over the years in technology business. That has been a fairly standard rate, even with ups and downs and changes in marketplaces.

Chairman KANJORSKI. Is that on a unit basis or dollar?

Mr. MCNEISH. Twenty percent of dollar amount and 23 percent on total business investments.

The industry itself has invested \$9 billion in 83,000 companies over a 35-year life.

Chairman KANJORSKI. \$9 billion?

Mr. MCNEISH. \$9 billion, yes. And I—of course, we are going to see a ratcheting up of those numbers.

Chairman KANJORSKI. What is the outer limitation of size?

Mr. MCNEISH. Size of a small firm?

Chairman KANJORSKI. No. Of a small business investment corporation.

Mr. MCNEISH. The new legislation was put into effect last year allowing a single SBIC to borrow up to \$90 million. So using it as security, there is a practical limitation of it putting \$45 million in private dollars and \$90 million in government sources for a total of \$135 million. That would be the practical limit.

Probably two major money market center banks in New York City, their SBICs are capitalized in the \$200 to \$300 million range. But the vast majority of SBICs are down in the range of having private capital of \$5 million.

Chairman KANJORSKI. Being from Pittsburgh, I think you appreciate my interest in Pennsylvania. Do you have the number of SBICs in Pennsylvania relative to other States?

Are you aware of it?

Mr. MCNEISH. I don't have the exact number, Mr. Chairman. But there are two in Pittsburgh, two in Philadelphia, one in the more central part of the State, and probably—

Chairman KANJORSKI. Five or six?

Mr. MCNEISH. There are about 10, in organization under the new legislation.

Chairman KANJORSKI. But in California, there are over 400.

Mr. MCNEISH. No, sir. There are relatively new in California.

Chairman KANJORSKI. Really? What State is the largest?

Mr. MCNEISH. New York. Probably about 90 SBICs in New York State. We used to have a large number in California, but that dissipated.

Chairman KANJORSKI. They gave up their charters?

Mr. MCNEISH. In part. What has happened is that we have had attrition in the industry, particularly in the past 10 years. There is a good attrition that has occurred where a number of the SBIC operators graduated to become private venture capitalists. And the SBIC industry was around long before the venture industry even existed. And if you look at the leaders of those venture partnerships today, you will see that a lot of them were SBIC executives. We have been the farm club for the venture industry.

A large part of the attrition has been due to voluntary surrenders, a lack of new people coming into the industry, primarily caused by the prior two administrations' attempt to close down the SBA.

Chairman KANJORSKI. Let me see if I can understand. The largest amount you can borrow from the government would be \$90 million; you would put \$45 million private; and that would be \$135 million. And you could go to the debt market for about three times that?

Mr. MCNEISH. No. No. That is essentially where you would stop.

Chairman KANJORSKI. Why couldn't the companies that got the \$135 million—that is their equity that you are lending them?

Mr. MCNEISH. The \$45 million is the equity; \$90 million is the government funding.

Chairman KANJORSKI. But that all appears on the lender's books as equity.

Mr. MCNEISH. It would. But the legislation, because of losses in the program, because it is a very high-risk business and concerns about how much extra leverage might stand in front of the government's position in the senior creditor position, we put an absolute limit on the debt that the SBIC could have.

It is only for short term and—

Chairman KANJORSKI. You mean the company could not go out and get a mortgage on the building?

Mr. MCNEISH. An SBIC could not.

Chairman KANJORSKI. The SBIC has \$135 million in equity.

Mr. MCNEISH. We are talking about two different things. I am talking about SBIC's capital structure.

Chairman KANJORSKI. I am talking about what the SBIC lends out in venture capital. If it was totally loaned out and as large as it could get, it could lend out \$135 million to any number of organizations?

Mr. MCNEISH. No, no, no. The \$135 million is the capital structure of the SBIC. Forget that for a moment. There is a size standard under the regulation that defines the element on what an SBIC can invest in, and that is changing. Hopefully, it would be codified soon. It could be \$6 billion in after tax income, net after tax income.

Chairman KANJORSKI. I am not sure I understand. You mean you could lend \$6 billion?

Mr. MCNEISH. No. I am defining the size of the small firm in which an SBIC can make an investment. The small firm can have no more than \$6 million in net income and no more than \$18 million in net worth. That defines the parameter.

Chairman KANJORSKI. And \$18 million in net worth, assuming that it is a startup business?

Mr. MCNEISH. Very good. It qualifies.

Chairman KANJORSKI. It qualifies if you have less than \$18 million in equity?

Mr. MCNEISH. That is correct.

Chairman KANJORSKI. And net worth. Assuming that it invests the entire \$18 million?

Mr. MCNEISH. That is just its net worth.

Chairman KANJORSKI. Say a company starts out and they say, we would like to borrow the entire \$18 million from the SBIC—

Mr. MCNEISH. At that juncture—the SBIC is limited in the size of its investment in an individual company, based on its own size.

Chairman KANJORSKI. And its own size is \$135 million.

Mr. MCNEISH. Private capital is \$45 million. It can only invest up to 20 percent of its own capital; \$9 million.

Chairman KANJORSKI. So any one company could get the maximum of \$9 million from one SBIC.

Mr. MCNEISH. They do syndicate deals.

Chairman KANJORSKI. Assume that we still have the singular example and the SBIC elects to take a portion and invest \$9 million. Then the corporation could go to the bank and say, we need a building, we need machinery and we have \$9 million equity so they could borrow up to \$27 million?

Mr. MCNEISH. Whatever the market will bear. That is right.

Chairman KANJORSKI. If the SBIC that is formed has the capacity to lend out venture capital of \$135 million, we could multiply that probably by 3 and come up with over \$400 million—

Mr. MCNEISH. Financial impact.

Chairman KANJORSKI. That is correct?

Mr. MCNEISH. That is correct. We finally got there. Sorry, Mr. Chairman.

Chairman KANJORSKI. Pennsylvania has so few of them. Mr. Klink probably hasn't even one in his district. I know I have not.

Mr. MCNEISH. The Nation doesn't have very many. There are only 200 in the country.

Chairman KANJORSKI. Are there any that are owned in other than private ownership?

Mr. MCNEISH. No. But the new law allows States and local governments to invest in SBICs.

Chairman KANJORSKI. How about nonprofit corporations?

Mr. MCNEISH. They could invest, yes.

Chairman KANJORSKI. If we took the equity interest of a nonprofit corporation, we could charter it and put it into business.

Mr. MCNEISH. The nonprofit funds could be. The SBIC would have to be for profit. Previous to the new legislation last year, and we credit Congressman LaFalce for his leadership on that, States and local governments could not invest. It has taken the position that that was not private dollars, and they were worried about too much political intrusion in the company's operation.

Now they can invest, but only up to one-third of the SBIC's capital.

Chairman KANJORSKI. This sounds like an ideal vehicle for an entity for business development in our area. We are not going to see one of the biotech companies that just pop out of Stanford and suddenly plop down in the middle of Pennsylvania.

But in reality, there are a lot of good technologies out there that should be developed. We can identify 20 or 30 of them, and basically challenge the entrepreneurial market. Say we have 25 or 30, we are interested. You come with a proposal or prospectus. And we are willing to stand as a major contributor of the equity to get this started.

This seems like a tremendous industrial tool.

Mr. MCNEISH. It has that potential. A number that we have talked to are looking at that very specifically.

I suggest this to you, Mr. Chairman, and it relates to high tech under S-4 and the Competitiveness Act that was passed last year. And I think it relates here as well. This is a high-risk business,



and there are losses that do take place. And one of the reasons for those losses—we have had experience in this—is for nondiversification, for concentrating too much in one particular kind of investment entity.

So our position has always been—and the experts that run these companies tell me you are far better off to have a diverse SBIC which may include high tech, but once you begin to load up your portfolio in a particular area, you run a higher risk of losing your dollars, the government's dollars, and everyone else's.

Chairman KANJORSKI. Someone like MIT or Stanford that has an ongoing R&D program matched with government efforts and has these people with brilliant, bright ideas, can run over to the SBIC and say "I have a great idea." We want to run private on this. Are they doing that?

Mr. MCNEISH. There may be some situations, but I don't have any definitive data.

Mr. PAGES. I know that MIT has their own licensing, high-tech transfer outfit. And they have a strong area for the venture capital community. And they have created a lot of startup companies based on MIT technology.

Mr. MCNEISH. I can assure you that they have their doors open to that. They may only do 10 out of 100 that they look at or less; but if you have that kind of a hot product, hot idea with commercial viability, the SBIC would be interested in it.

Chairman KANJORSKI. People that put the other 90 together, what happens? Do they fall by the wayside? Are they not good deals?

Mr. MCNEISH. For the SBICs or the venture capital's perspective, they may find funds at a different SBIC.

Chairman KANJORSKI. As I understand it, the SBIC does an individual burdening situation analysis?

Mr. MCNEISH. The deals are negotiated between the entrepreneur and the—correct.

Chairman KANJORSKI. We will take equity and convertible bonds. But they cannot go higher than 50 percent.

Mr. MCNEISH. That is correct. But the deals are negotiated between the entrepreneur and the investor.

Chairman KANJORSKI. And does the deal work where you have numbers larger than \$9 million?

Mr. MCNEISH. Yes, they do syndications on larger deals.

Chairman KANJORSKI. Venture companies come in, too, and jump into it?

Mr. MCNEISH. Oh, yes. Sure.

Chairman KANJORSKI. I do not want to cut you off, but we have so many questions that we want to get in, particularly in your area because I look at that as—

Mr. MCNEISH. Two additional items I would like to cover. One, the new legislation, because as a consequence of a convergence of happenings, there was a shrinkage in the private venture capital marketplace because endowment funds and pension funds were contracting in terms of venture deals and that market shrunk considerably.

So there was a shortage of venture capital. You had a drying up of financings of new starts. At the same time, you had the SBIC



industry shrinking. So you created a new capital gap, if you will, in the marketplace. Then what I call the Miracle of 92, under Congressman LaFalce's leadership, and the wisdom of Congress, major changes were created.

The access to SBIC's sources of investment was always in debt form. Those companies had to invest in debt securities that would throw up enough cash-flow to service their own debt.

It is changed now. The new law increases the dollar amounts that SBIC can take down, increases the range and scope of businesses which an SBIC can invest, opens new access to sources of new capital, State pension funds, private pension funds. But the fundamental change it allows is for an SBIC to leverage capital through equity-type security.

And back to your point about the government getting an equity piece. Indirectly, SBA does get a profit participation now in the profits of an SBIC. It is the first program I know of in the government where SBA stands to be a profit center for the U.S. Government. And if the program works, you will be. It is a tremendous leg up. And we ratcheted down on some of the risk factors in terms of outside debt that provided that profit participation, solves a fundamental structural problem.

Working with the SBA to get a whole new set of regulations, which are close to being finalized, the program is about to be in place. We haven't had to do any marketing of this. The word has spread like wildfire throughout the financial community. We have a prospect list of 3,000 groups interested in forming SBICs.

I suspect that 50 percent of those are very solid, real prospects. I expect this coming year we will probably have 200 to 300 new SBICs applying for it and licensed. It will bring \$1 billion into the SBIC industry, with the potential of \$2 to \$3 billion of government leveraged funds. We are talking about, in a few years, we are going to have a small business financing vehicle for high tech and other endeavors in the range of \$5 to \$10 billion over those 5 years, but very significant from where we are today. A major change.

There are a few things, just to get my pitch on the table while I have the opportunity. We could—certainly the capital gains provision that was passed by the Congress last year was a good start. It is an expansion to induce more capital into that marketplace. I will be glad to provide some suggestions that we have on that point.

Chairman KANJORSKI. Would a secondary market help where we could feed off of your securities that you invest in, pool them, and sell them off to pension funds and insurance companies?

Mr. MCNEISH. That hasn't been an issue for the SBIC as the equity provider. I think it is more germane in a long-term program where you need the funds for liquidity. There is beginning to be a secondary market developed in the private venture capital industry. It may come to that as the SBIC industry grows, but right now it is not essentially in this area. We would like a very small tax change. We would like exemptions—we worked on it last year, and we will do so again—to eliminate that tax problem for any investment in an SBIC.

No pension funds has invested in the SBIC historically. Now they will, because it is an equity-type vehicle used for leverage. But

it causes a tax implication for the pension fund. A small technical change, minor revenue impact in terms of the given correction, and we will be going at it again.

We are not talking big dollars because this program has the subsidy rate of 9.5 percent at the moment. It will probably be lower shortly. Two or three technical amendments to the new SBIC legislation have to be worked on. And we are working with Congressman LaFalce for that.

We do need strong congressional support for the SBA. We have a home run in Erskine Bowles, who is the new Administrator, because he comes from an investment bank background and he knows, for the first time in many, many years, the distinction between equity and debt for a beginning. He talks the right language, and he knows what the business deals are all about. He is very close and knows a lot of venture capital players. He is going to be a home run for us. But he needs funds and resources as well.

Chairman KANJORSKI. But the size of your investment is beyond the realm of small business, the ability to get into business—you get into businesses much larger in size than what is traditionally called a small business.

Mr. MCNEISH. That is the ceiling. The average investment for an SBIC is \$275,000. That is only the ceiling that we were talking about in the large numbers. Most of the deals are much smaller.

In this new legislation, it restricts SBIC's investments to only equity investments which will generate—

Chairman KANJORSKI. You couldn't take a convertible bond?

Mr. MCNEISH. It would be defined as an equity investment. Only in a restricted way would a convertible bond qualify. It is going to generate—we have a lot of seed capital funds out that can't raise money any place.

We are going to use the SBIC Program and put together pools in the range of \$10 to \$15 to \$20 million for seed capital startup investments in high-technology firms. We have great hopes for it. We need to assure that SBA will be a reliable arm in this with the cultural change that a creditor agent is now a limited partner willing to take risks. And we are lucky to have Erskine Bowles at the helm.

But if the wrong signals come out of the government, the investment community will walk away; and the SBIC Program will die on the spot.

Chairman KANJORSKI. Mr. Klink.

Mr. KLINK. How difficult is it? How much time does it take from beginning to end, if you want to form an SBIC?

Mr. MCNEISH. Assuming you have got a complete license application together, money, either committed or prepared to go, and all the legal documentation done, SBA's target is 90 days. As a practical matter, it is 4 to 6 months.

Chairman KANJORSKI. How long does it take to put the package together?

Mr. MCNEISH. Not that long. It is a business plan. What the investment plan is, legal documentation; and that is essentially it.

Mr. KLINK. You mentioned the fact that you thought there were some better things that we could do other than—you view the re-

cent budget as a beginning, but did you like Mr. Stewart's idea on the capital gains?

Mr. McNEISH. Oh, yes. I think any of those incentives will stimulate investments in the SBICs or into the investment markets. Those changes are very important. Yes.

Chairman KANJORSKI. Is it reasonable to say that everybody on the panel agrees that there is a dearth of capital available for entrepreneurs or new ventures?

Now, we have had previous testimony that that hole seems to be half a million to \$5 million in size. After you get a lot larger than \$5 million or more, you can get to the investment banking community that will start looking at your proposal.

Mr. McNEISH. \$5 million in—

Chairman KANJORSKI. In venture capital. The real need is half a million up to \$5 million where an entrepreneur cannot get into the banking house. That is where the gap is?

Mr. McNEISH. I have a problem with oversimplifications like that, Mr. Chairman, because it varies, industry to industry, dramatically. The biotechnology industry, the threshold is very high. It depends what you are looking at. Are you talking about the mice or the gazelles? The mice being the mom and pop, stable operations that don't grow, versus the gazelles that might be the Apple Computer in somebody's garage that could grow into a multibillion dollar company in a number of years.

It is a wide divergence from when they will need access to the public markets. There is a whole range.

Chairman KANJORSKI. I think what I was trying to say, if you want to go into business, you can generally scrape up half a million dollars from family, friends, and associates and maybe bank loans, but you have a difficulty going above half a million because investment bank houses do not like to look at those small propositions. They like to stop at the \$5 million or above figure.

So the real gap here, that venture capital is hard to come by, is the—in the \$500,000 to \$5 million range.

And this is a range where somebody getting an idea for a new technology or defense conversion would get stopped because he simply cannot raise it locally. He cannot get the attention of the investment banking community because it is too small a deal.

Mr. McNEISH. That is exactly right.

[The prepared statement of Mr. McNeish can be found in the appendix.]

Chairman KANJORSKI. Is that what your general experience is, Mr. Stewart?

Mr. STEWART. I am afraid the more you have been with this subject, the less willing you are to generalize. I just think that the SBIC as an instrument is 35 years old. It has done a great deal of good; and it trained two generations of venture capital managers and made a major contribution to this country's economy.

And I am perfectly willing to concede that the area between \$500,000 in need and \$5 million is a very tough area, and it is one in which an entrepreneur hits a ceiling very quickly. What I think you also have to remember is we don't all live in Phoenix or Pittsburgh in America. We have 50 million people in rural areas, in my opinion, who are totally outside the technology change area so far.



And getting them into this game is something this country has to do.

We are not going to face the future with MIT and Stanford and Carnegie Mellon and nothing more. You have got a population that is not yet technologically literate. We are told it is 30 percent illiterate functionally in terms of alphabets.

In terms of technology, if we have got 5 percent, that is a lot and the kind of things that we have been talking about, funding technology, it is smaller yet. And the reason I think it is important to bear in on this, when I finally found out how big and diverse this country was, was when I had to deal with the SBIC industry.

I remember deciding cold-bloodedly that if I was a licensing outfit, I would want to be able to report that I had put at least one SBIC within 100 miles of every inhabited place in the country. The market won't do that. The market will take money from all of the country and deposit in a few million centers and will do that endlessly until all of your investable assets are there, unless you learn, I think, how to move it back to the grassroots.

Chairman KANJORSKI. How do you get into what I call the secondary market? I agree with you.

Mr. STEWART. It takes time. You have to spread skill as well as money. There are people now who are going back to rural areas from big cities because of lifestyle considerations. We love it when they turn up in a part of the country and live in the country because they become immediately a nucleus for knowledge, investment, everything in the town. Everybody gets excited just because somebody from town knows all about venture capital and is there to talk about it.

You can see things begin to happen. What can you do about it—I don't know, there are some sorts of premiums—well, the place this bothers me the most, probably, is the great disparity in performance between States with respect to the SBIR Program. California—let me just—we aren't talking about this very much. But five States, probably win 50 percent of the SBIR Program.

Chairman KANJORSKI. What is the SBIR Program. I do not like to sound stupid, but in your terms, what is it?

Mr. STEWART. This is a program in which each of 11 Federal agencies that puts into the private sectors outside the government at least 100 million bucks a year. They are required by law now to take 1.5 percent of their total R&D budget and set that aside and make small companies compete for it on topics they say are important.

So the Department of Defense comes out with a small-scale telephone book with 800 topics on every possible technology you can imagine. And if you are a small businessman, defined as under 500 employees right down to 1, can you compete. What they are putting down are lists of problems. They say we want to see a proposal that will do X or Y or Z.

Chairman KANJORSKI. Is that on a 50/50 basis?

Mr. STEWART. No, no, the government puts it all up. This is not equity or debt. This is grant. This is absolutely free money, if you like.

Of course, we all know there is no such thing. It costs you between \$5,000 and \$10,000 to prepare a proposal. Despite that, I am used to the time zones of the SBIC Program, in the SBIR Program.

In 10 years of operation, it now draws over 20,000 proposals a year. So the people that tell you that there are no small high technology companies in this country just don't know.

Chairman KANJORSKI. Twenty thousand proposals for how many projects?

Mr. STEWART. One out of ten is funded at the phase 1 level; and this is the biggest, toughest Federal competition ever in the procurement area, and I think the most successful. If you win a phase 1, you get now up to \$75,000 for 6 months of research to test the feasibility of your idea. That is just the first step.

You file a report on it. And if it has been successful, you are encouraged to apply for a phase 2 grant or contract. That can be now up to \$1 million, normally up to \$750,000, and that is to fund 2 years of research.

Now you have taken your proven idea and you are now getting it ready to go into the marketplace, and that is the 2 years that is funded by phase 2.

Before they will give you the phase 2 money, nowadays because the competition is keen enough so that the government can demand this, they look, we want to be sure there is a market. We work for the government. We don't know much about markets. Bring us a commitment from some big company or bank that says they will fund you into phase 3 into the marketplace, and that is a hard test for a company with an idea. But it is happening every day now.

Chairman KANJORSKI. Who comes with the idea? The company or the government?

Mr. STEWART. The government comes with a statement of need—they both do.

Chairman KANJORSKI. Who determines what the need is?

Mr. STEWART. Technology people who work in every agency.

Chairman KANJORSKI. They say it would be nice to have an antigravitational machine.

Mr. STEWART. If we had a semiconductor chip that worked 10 times as fast, that would be greater or a pilot's glove that—

Chairman KANJORSKI. How long does this take to get the first funding and—

Mr. STEWART. This month the Department of Defense issued a solicitation. You have 3 months—

Chairman KANJORSKI. Is it only the Department of Defense?

Mr. STEWART. No, no, 11 agencies.

Chairman KANJORSKI. How does one get to where that information is offered? We would like to get all 11 of those.

Mr. STEWART. It seems to me what you do is call me or my wife.

Mr. PAGES. It is listed in the *Congressional Business Daily*.

Mr. STEWART. It is referred to in the *Congressional Business Daily*, and we probably have by now 7,500 to 10,000 companies competing due this 20,000 proposals a year. The reason you find out is because you know about the health field and you know NIH is in this game and putting stuff out. When that first solicitation comes out, you have 3 months to prepare your proposal.

They take another 3 to 6 to 9 months choosing a winner, because they have to circulate it among engineers and scientists. They make the award. The award gives you then 6 months of research to do.

You do it, you come back and you apply for phase 2. Another 3 months is burned. You get 2 years of work. And at the end of the 2 years, you are supposed to have your product or service ready for use by the government or by the private sector. One or the other.

And we can't tell you that it is the greatest thing since sliced bread, we don't try. But independent estimates, the GAO has done three studies of this, indicate that it is bringing things to market at what is to people that come out of the venture capital business a very high rate. It is long and hard—

Chairman KANJORSKI. I have never been terribly impressed with the business acumen of bureaucracy. I have been through a few of these things.

Mr. STEWART. What the business—what the government people can do, and let's face it, they don't live underwater. They get pretty good ideas from business people who are happy to give them to them if they will only listen. So they get the idea for proposals wherever they can. And we keep trying to improve that process, their understanding of what the market needs.

Chairman KANJORSKI. If you are getting 20,000 proposals, that means that there are 20,000 entities out there, many of them small businesses that want to do something.

Mr. STEWART. Yes.

Chairman KANJORSKI. Has anybody overlayed those with the technology we already have that they could take and utilize and bring to market or utilize?

Mr. STEWART. In a way we are doing that in the SBIR Program. We have now brought this new computer to make it fast enough to do these things. We would like to also process data in parallel so we need some new algorithms invented. So the existing technology base is what these proposals are based on. That is point number one.

And the reason I think the SBIR Program is successful is it is like the SBIC Program. You are mixing private entrepreneurs and public servants very early on in the process. And the private entrepreneurs are able to do what they know how to do best, which is to size up markets, size up products, estimate cost, estimate prices. And they do this in the proposals they make. So that the proposal doesn't mean anything unless it draws a realistic answer.

Chairman KANJORSKI. Let me ask you something. It really is something—obviously, that I am questioning, you as a 9-year Member of Congress, and I am still not fully aware of what we have to offer out there and this is my jurisdiction. How many people, percentagewise, in the United States are aware that these programs are actually out there?

Mr. STEWART. Very small.

Chairman KANJORSKI. Don't you think we have done one hell of a poor job in advertising? I am probably a bigger seller for SBICs than anybody in my area of Pennsylvania. I say, why don't you go and look at the Small Business Investment Corp.? They look at me like what is it? Where are they? What do they do?



Mr. STEWART. Mr. Chairman, when I was young and optimistic, like some young Congressmen are, I used to say that it takes 2 years for a small businessmen to find out about a new Federal program. But the lawyers and accountants will take that long to find out about it.

But I have to tell you that the SBIR Program has been a public program for more than 11 years and I am convinced that at least one-third of the people that should be competing don't know about it.

Chairman KANJORSKI. That goes back to the piece of legislation. You see that we are trying to do four elements in my legislation. One, getting a one uniform data bank. That will give us all information on what the government has. And, hopefully, expand it to include what private enterprise has in licenses available.

Presently, you have to go knock on the door and find the right person who has an interest to tell you about it and there is no benefit for him to tell you about it. So the likelihood of getting a response is not good.

But assuming we get the data base in place, and we think we can do that in a year, one of the next elements is the creation of the American technology network, which effectively would be a 24-hour-a-day "Discovery-type" program, broadcasting government technologies, government programs.

In other words, we do 20 minutes on an SBIC and how it works. We would explain the SBIR Program. We would list the programs that are out there so that average people, that are in business, that want to go into business that are still in school, or that are in the defense industry that could get out and convert this technology in the field. It seems to me that this is a very cheap format to use to advertise to all Americans what is available to them. Do you see any downside to that?

Mr. PAGES. If I may simply say, I recently read that National Technology Transfer in West Virginia is setting up an on-line program that is similar to that.

Chairman KANJORSKI. They are part of the program in terms of the data base, but we will have the data base accomplished in a year. That is already moving through. We are going to have the data base.

The biggest part of what I am trying to do is break down this present system where you have to go to a consultant or a lawyer to find out about what the hell is available to you through the government. It seems to me that should be available to any American at any time and it is up to us to educate them about it. If we are going to spend half-a-billion or \$1 billion for a program, it seems that we should spend \$1 million to market and do it in an understandable fashion.

And I cannot think of anything more inviting than to see a new technology on CNN or Discovery, and find out how to get into that system. And that is probably the most innovative part of that idea; how we go about marketing not only the technologies and licenses and processes that are available, but also the programs. We should be matching programs with resources out there for people to utilize without having to hire very expensive people.



Mr. LUDLAM. Mr. Chairman, Milt mentioned Bill Wetzel at the University of New Hampshire who is the dean of the researchers on the capital formation in the United States. He is probably responsible for the 1978 capital gains tax cut. He is a great advocate for venture capital networks which have been created in many regions of the country, which basically are markets in which venture capitalists and entrepreneurs can meet.

There is one in New England. There is one in the mid-Atlantic area. There are others around. And they even have cattle markets or whatever you want to call them, major conferences. That is a private sector activity. It is not the government providing the introductions. It is not the government's data base.

Chairman KANJORSKI. But at this point in time you would already have a technology that you would want to move with.

Mr. LUDLAM. Well, you would have a proposal for a technology. The proposals of the entrepreneurs are in every stage of development.

Chairman KANJORSKI. Bob has clarified. We always make this mistake, and in dealing with so many people, we use technology transfer, it has got to have 100 definitions in our system, And maybe I should define what I am talking about.

The technology I want to transfer is presently developed R&D, through the pilot stage and is ready to go to commercialization or has already gone to some small commercialization but has not been moved into the private market.

Then the second thing, when I use the term "network," you guys are computer bugs. I am talking about literally an American technology network on TV. We would have a technology channel like Discovery, like CNN, that would share in an entertaining way but at developing gradations of understanding of technology, probably as simply as possible so that the entrepreneur could understand it. And if he gets interested in the new system, he could take the menu and deal with complexity by pulling it up on his PC or delegate a scientist to work on it.

We are trying to alert the average people in the secondary market as well as the major markets to the fact that, hey, we have something that can convert wastepaper to ethanol, and we already have it. We spent \$25 million studying it and it works, but nobody has taken it to commercialization. It is there and licensable.

And part of that program that we would have a concept on, we are going to tell you that there are 200 small business investment corporations that can put the capital together or pool the capital for you. We want somebody to describe what kind of prospectus you need to develop. You could pull up on the PC and draw it off the government network; it is outlined, and you just have to answer the questions at the end without going to a Beltway bandit lawyer.

We want the people to be able to go to a single contract officer of the government and say I am interested and I want to pursue this and she/he can contact you on the television, go through the transaction, and you walk out the door with a contract. You do not have to spend the year with the government.

You either have it or you don't have it and you see if you can put your money together. We have a financing vehicle that we are

working on now. Basically, that is what this hearing is about, what should that financing vehicle be.

I would like to use a good part of the SBIC. Legally, I do not know that that is the only part I would like to use. It does put into place a filtering mechanism of private decisionmaking as to whether or not this was a ripoff. I remember a young man who borrowed \$3 million from an SBIC to drill for oil and paid himself a quarter of a million dollars a year until he went bankrupt. We do not want that. But we do want people that have the capacity, even if they are without funds, but I can think to myself how many people graduated from the Wharton School or Harvard Business School that probably are not in that field at all because there are no jobs, but they are people that have the capacity, and they have been trained; they could find businesses and attach to them and find a process or technology and start to run with it.

I think we have probably within the private sector or in the government sector, all of these parts already in operation. No one has synthesized them. No one has bothered to notice how frustrating it really is to get through the system. I guess you realize that I want to get the idea from you, if we can today.

What does it take to get through the system? Maybe I should do it in the nature of what we did last time in a case study. Make this assumption. There is a John Smith, 51 years old, middle management, scientific background, working for General Dynamics, in Groton, Connecticut, has had a fairly good salary. He is 51 years old. He has been told that he will be getting a pink slip shortly as the submarine facility closes down, and he has decided that he does not want to work for anyone anymore.

He has 20 years of sufficient experience in his life to say that he would like to try a business operation on his own. But he only has savings or net worth of half-\$1 million; some of it not as convertible as he would like it to be, maybe a lot of it is in his home.

Now he has found a process that the government owns that he thinks he could take and convert to a good small business and make money with it. He has found that he can license this process. He found it in the inventory, he saw it and talked to the developer. He has the ability to get the license, but he needs \$3 million to put the deal together to start. That is his problem.

How do you think we could go about solving that problem? What exists to solve the problem already? I know Mr. McNeish is going to say call up one of my SBICs and he is in business, but I would appreciate the whole panel participating.

Mr. LUDLAM. I can comment on the capital gains incentive that goes for investments.

The capital gains incentive that was adopted in the Budget bill provides incentive only for direct equity investing in a small firm. That is the cheapest form of capital that a small business can get. There is no carrying cost on the debt. They have to give up ownership in the firm.

Chairman KANJORSKI. How would he know who has \$3 million to invest?

Mr. LUDLAM. I was mentioning the Bill Wetzel networks where he would meet with sources of capital. These can be meetings.

There are also bulletin boards and other networks and they already exist and that would be one of the places they could go.

Ms. LEVERE. I would say that the place to start is one of those places. If he lives in the city, call up the economic development in the city.

Chairman KANJORSKI. He does, and the guy says, look I make \$90,000 a year. My job is to make grants to keep my operation funded. And I do not give a damn about you.

Ms. LEVERE. I would counter that in two ways. In the city of Pittsburgh they have a good economic development department where the folks are trained to understand the range of financial sources. That is where the one-stop shop happens. The second place where there is not, where it should happen, it should be in the small business development centers and that is where our gross weaknesses are. If we were to say that we were going to create a primary care system where the businesses could come in and get the right information—

Chairman KANJORSKI. I have to be critical of you. I deal with a lot of these people. I do not find them to be entrepreneurial in nature. They are bureaucratic in nature. I do not know if they would appreciate a new mousetrap if they saw it. They are like a lot of us, it is a lot easier to maintain the status quo than to take a risk.

So they would much rather finance a MacDonald's than a new computer or a new process. And they are geared that way. If they were not, they would be investment bankers.

Ms. LEVERE. The point is not that they do the financing themselves. The point is that they know enough that if there is a network in the city of Pittsburgh—

Chairman KANJORSKI. I know, I have just had this experience. I will give you an example.

A young man finds a new way to make holes in metal, holes one micron in size. Nobody else in the world can do it. If he can succeed at that, he can make a metric printer that can print the circuitry of semiconductor chips, very valuable to this field.

He goes to the economic development people in Pennsylvania. They came up with the Ben Franklin project. He goes to the Ben Franklin project, and those go through the process of 30, 60, 90 days application. It ends up that he gets his grant, a part of his grant for that. He comes back to me. I just talked to him a couple of days ago and he says you talk about academic welfare.

They gave me \$35,000 to contract with a researcher so that we can pay the professors to do the research that do not know half as much about the process as I do about it. I took the money because it looks nice on the prospectus, but it is a waste of money.

We have built these systems to support the national laboratories and the universities and to support the economic development people, but we are missing the mark on the people that are really entrepreneurs in our system. They are going to put 14 hours a day in. They have the dream. They have the idea. Give me the capital to run with it. Let me decide who I take or do not take with me.

Mr. Stewart said I like the SBIRs, but you know the average businessman when he looks out 2 or 3 years, he has got his rent and costs and salaries to pay. He does not want to get involved in 2 or 3 years out going through hurdles. He wants to find something



he can do that he can reasonably put together and pay attention so that is going to produce funds at the bottom line to pay the cost of an operating, succeeding business or else he is going to be out of it.

The problem is that working with some of these people, that can be critical to the people in my district, they give you the typical, go to the SBA or you go to what used to be EDA. These are no longer in this type business, and the ARC as well. And they give you, what the hell, 42 places to go. And the next thing you are going to do is to go for the next 3 months of your life talking to people.

They will tell you that they used to have a program, but they are underfunded and do not have it anymore. Or they will tell you that we have a process, but we are in the process of a change of administration and they have not made any appointments and so nobody is making a decision in that area.

It is sort of like a run around in terms of—I take it as a test of fire. If you can make it through, you are either the most nimble-brained person in the world or your staying power is so fantastic you are bound to make it.

But 99 percent of the people get out of the system. It does not appeal to them. What I am trying to look at is something fast. If we are going to take risk, and we recognize to take high technology to commercialization is a risky business, we are going to lose a lot of money at it but let us lose the money easy. Let us ship it out there and hope we hit a couple of Microsofts or Apples, or that we hit a couple of Biotechs and we cure cancer or AIDS.

When I criticize bureaucracy, it is the speed that is what I criticize. These people would not be in bureaucracy if they had imagination to take risks in business. It is the antithesis of what we are trying to get to. We are trying to find a way to let the poor guy who has a great idea, he is almost compulsive, to get that idea and get him into business. How do we do it?

Mr. PAGES. One point we need to go back to is that it may be a great idea, but it is not attached to a good business plan, so if you provide those kinds of services, for planning and market development.

Chairman KANJORSKI. We will go with that. It is me. I know how to write a business plan. I can hire a consultant, but you know what a business plan is. It is a series of questions that you have to answer, and it helps you through the logic to get you where you are going.

Mr. MCNEISH. But there is no logic in the government, Mr. Chairman.

Chairman KANJORSKI. But I think that this transfer corporation ought to have contracts in simple language that do not need a lawyer. It ought to have business plan models so that you could pull up a concept business plan, and have somebody test it and check it out, but not go through the consulting.

Mr. MCNEISH. I am shaking my head. I don't want \$1 million professional doing the business plan, but I don't want the model on the computer either because that is going to tell you nothing. It is a model that gives you the answers, that is what I am concerned about.

Chairman KANJORSKI. Business consultants only sit down with you and ask you the right questions.

Mr. MCNEISH. He has got to be able to write a business plan and tell that investor exactly what this is about, what the management team looks like. There are some very fundamental things. And assume he does that and does it well. It is not all of that. It has got to be done better than all of those 99 other business plans that floated into the SBIC's office.

Chairman KANJORSKI. Then you are going to be making the judgment to a large degree based on how it appears as opposed to what the depth of the idea is?

Mr. MCNEISH. I know how it appears, but——

Chairman KANJORSKI. What I want to get away from is grantsmanship.

Mr. MCNEISH. Assume he has described the team, the market support, the whole business. OK? Probably got a very limited number of resources to go to at the stage he is. SBIR you don't like because it is a 3-month, 6-month, 9-month project. It is not going to help on the deal right away. The angel networks is one. And Chuck was right when he said he is going to tap one of those.

But it is going to give him a reference list or capacity to access individual investors who have to have, if you will, surplus cash to invest in potential deals where they are going to make some money. And there may be some of those in anywhere in the Eastern United States.

Chairman KANJORSKI. Are we going to find a way through the system so that he can send out a proposal and have the appropriate people respond if they want to hear more so that he does not have to make all of these calls?

Mr. MCNEISH. This is to match the investor with the entrepreneur, no middleman.

Mr. LUDLAM. And the beauty of it is that the individuals who are investing can afford to take losses. It is not like a government which is going to have a political problem taking losses. These are high-net-worth individuals who have money and they can take some losses they can play the game of 1 out of 10 or 2 out of 10.

Mr. MCNEISH. If he is lucky he will find someone that has made holes in metal or something like that and knows the field. There are ways that the government could support that network.

Mr. LUDLAM. There are proposals in terms of seed money for the networks where the government is not acting as an advisor. It is not marketing proposals for funding. There are offerings under the Securities Act under reg D. There is a private placement market for equity investments in a private, not a public placement, but a private placement to certain selected high net worth individuals and only to a certain number of them because it is a risky market. That is a private market that already exists under the Securities Act, not a public market, a private market.

That is one possibility in terms of the private venture capital networks and the angels who invest under reg D or Score investing. There are several exemptions from full registration, all in the private sector.

Mr. MCNEISH. The question is somehow there has to be a mechanism to get him to know what the market is to get him to shop his deal.

Chairman KANJORSKI. He cannot afford to spend 6 months or 1 year to sustain him and shopping on the maybe or on the come. Eventually, he is going to get where he is going to be frozen out because he cannot go on.

Mr. MCNEISH. It could be the angels or the SBIC. At that stage, I doubt it at the moment. But somehow he maybe stumbled across my organization and we give him a contact point. The telephone number, the size of investments they do, and that summary and he has to figure out which companies he really wants to shop with. Maybe a joint venture company with a similar product that will need his product when produced. He is going to find that kind of access to a market as well. There is a range of potentials there, it is just a question of his nimbleness.

Chairman KANJORSKI. Do you think there is anything that we could do by trying to help index and cross-reference this together as far as the government can to save the time, the effort, and the frustration to bring the private sector together. In other words, why should we not have a corporation where the guy out in Kokomo, Indiana, Wilkes-Barre, Pennsylvania, shouldn't make fun of Indiana—Pennsylvania, that has the idea, can find a way to gain the information people quickly? Why shouldn't the government be able to interact with this network, this is what you have to do, and you will have a response within 7 to 14 days as to whether anybody is interested in floating you.

Mr. LUDLAM. The government can certainly facilitate the publicity about the existence of the existing private sector network, can provide seed money for those networks, training—

Chairman KANJORSKI. Should they? That is the question.

Mr. LUDLAM. That is a case where the government can provide some capital and some expertise to the networks and then let them operate the networks. In that sense, they are taking the risks. It is entrepreneurs dealing with entrepreneurs, dealing with investors, and inventors or whatever it happens to be.

The government can stand above the process and not vouch for any technology, not make any compromises, not get involved with any mistakes in characterization, not be sued for investments that go bust or any other liabilities it might have.

Ms. LEVERE. You are providing the roads and the infrastructure.

Mr. PAGES. Theoretically, the Commerce Department provides this service now, to some extent. They have a clearing house on State and local technology initiatives. But I think you are attacking the heart of the problem there. It is very difficult to access.

I am in this business for a living and it took me about 1½ years to find out that this office existed, and it is staffed with a very small number of people, so it does not provide the sort of hands-on service you are looking to do. So if we could get more funding or a more user-friendly service of that type, I think we would be making an important contribution.

Mr. LUDLAM. On that same proposal, that clearing house is another proposal I drafted for the 1988 Trade bill. The idea there was that the States have industrial policies where there are extension



services and capital from public pension funds and a whole variety of programs. They tend to be much more adventuresome and much more connected with private firms than the Federal Government will ever be. They have all of these different programs.

The purpose of the clearing house at the Commerce Department is to advertise those State-level industrial policy programs, and to facilitate communication among them, and for the Federal Government to learn from them, because they are the experimenters.

You have got 50 States, all of these counties, local governments. They have a degree of experimentation in terms of the kind of outreach and the hands-on programs you are talking about, that the Federal Government should use. They should be laboratories, and in many cases the program should go through the States, or even the counties or even the cities, because they have all of these facilities, the advice, the capital, the markets, the networks, whatever else.

So if you are going to do it through principally with the government program, the clearing house can give you all kinds of options in terms of programs that are already in existence.

Mr. McNEISH. The Federal Government is lousy at marketing almost anything.

Chairman KANJORSKI. Absolutely. That is why in the bill I have put together, the Federal Government does not do it. The Federal Government contracts it out to a technology transfer corporation which is privately owned, privately financed, driven by the bottom line. You lose your shirt if you do not market this stuff.

We had testimony the other day by one of the directors of one of our information services, and I think he is very proud of it. He probably should be considering the poor record. But the record, if I recall his testimony, was that over the last 4 years they have succeeded in licensing 314 technologies, and that represents 50 percent of all the technologies licensed by the U.S. Government. So that in 4 years only 628 were licensed, if you take that number, and this organization has derived in the 4 years \$36,000 in revenue for doing that, and that represents 90 percent of the funds derived by the Federal Government for licensing technology in the last 4 years.

And they are proud of that. I guess it is better than having nothing, but my idea is that if you are getting \$9 million back in revenue on \$70 billion on research and development, something has gone awry. It is hardly worth us being in the business, it seems to me. And it seems also that putting myself in the mind of bureaucracy, to market something that you do not have to market because it does not make anything to you—

Mr. McNEISH. There is no reward for it.

Chairman KANJORSKI. There is no pattern out there to drive you or no behavioral reasons out there to drive you to accomplish something. So what we have tried to do is structure a private venture operation that the government would have only a part of and get a repayment, but it would be purely privately driven on the bottom line to take this technology, find a market for it, and find a way of marketing it or advertising it, and then share in the proceeds with the government on whatever it markets.

It seems to me that it would be driven, there would be an incentive for people to do things. There would be a reason why you would take the 20,000 inquiries, you go right to SBIR and say, give me the name of these 20,000 people who put in proposals, because I am going to do a search of technologies related to their type of business, do a computer overlay, and send out information immediately, contact them, come on in, we have got some technologies that you might be interested in buying. Who else is going to do that?

It always reminds me of government lawyers that run defense or government services. If you have ever met them, they look forward to picking up that telephone at 5:05 in the afternoon just to get the 700th file as much as taking hemlock poison. It is just like, why do it? They do not get paid anything for it, they just take another headache, another annoyance on. The guy that stays there at 7, 8, 9 at night, he is driven for an entirely different reason than altruistic reasons, generally. We sort of miss that in the government.

On the other hand, we are the only ones that have the information, we are the only ones that can structure an easy flow and put the financing up front to do it, and I think we have the largest interest to get it done. After all, you know, as I think you made the point, new technologies do not necessarily build jobs, so it is not a political thing, it is just creating a firmer base.

If we want higher taxation in the country, higher productivity and a higher standard of living, I think that there is a driven force in government to do that. But private enterprise, they are interested in the profit motive out of their simple thing. They are not interested in hiring more people to do something. They are going to use the mechanics or the things that use the least amount of employees and the least amount of cost to get the highest profit, which they should, to be more productive.

Mr. LUDLAM. In terms of the 20,000 SBIR proposals, I have talked to some venture capitalists who recognize that that is a tremendous potential for them. Some of it will be funded by the government, but not many.

Mr. STEWART. Few.

Mr. LUDLAM. There is not much of a network in terms of the other proposals where they can match up the venture capital. The Chairman of the White House Conference in Small Business in 1995, and I have personally talked about this. He is interested in these proposals, and you could work out a network with private venture capitalists to market those other 19,000 that don't get funded by the government.

Chairman KANJORSKI. Can you get us Bill Wetzel's material?

[Mr. Wetzel subsequently testified at the Subcommittee's November 16, 1993, hearing and the material referred to here can be found in the appendix for that hearing.]

Mr. PAGES. The same process would work for the Defense Conversion Program, the technology reinvestment project. There are 2,800 applicants for that and there is an assumption that up to maybe 300 might receive funding. So there are 2,500 applicants who receive no support. Of that, half may have good ideas. There could be some sort of informal linkages created.

Chairman KANJORSKI. It seems to me from the testimony that we certainly have an entrepreneurial market out there. We have people who want to do things, and they will make money and they will create jobs and increase American productivity. It is, I guess, how we get to them.

I know that I have been trying your patience for a long time, but I wanted to ask probably each panelist if they could give us the three top suggestions of what we should do. You know the legislation we have. You know our jurisdiction. What should the government do? If you were in a dream world and could make a wish list, what are the first three things, the top three things we should do? We will start with Mr. Stewart.

Mr. STEWART. I have given you six here, and I know they are small, but I am terribly anxious to leave a record which maybe misrepresents how people feel, how witnesses feel, anyway. It is very hard to say to you, no, don't do it, because the problem is there and it is enormous. We have a country that is still coming out of one kind of economy and moving into another, and we have to remake every institution in it. And I mean every institution. And it is painful, and it is not very easy to see very far down the road.

So the things I have most confidence in are small things that I know will work, and I work it one or two or three steps further. When I get down to the ring on the floor, what I am afraid of most is that you are going to wake up one day disillusioned as anyone has ever been when you find out that the treasure trove of Federal technology isn't maybe what you think it is.

I have been in a room, Mr. Chairman, with people who invest money in technology, where somebody from the Department of Energy had made a speech and was explaining to us what he really meant and whatnot. They have 3,000 patents, right on the shelf, just lying there doing nothing, and then I heard all of these other people ask him, why do you think they are living on the shelf? Don't you think we have employees in Washington looking at patents, government patents as well as private sector patents? You are not outside the marketplace. You are just on the edge of it. We watch you all the time.

Now, it might be worth doing it, what you are talking about, just to find out what the truth is, because it is an open issue. Now, with me, that is a reason I am a sucker for something like the SBIC and the SBIR. You are mixing characteristics of both the private and public sector, both of which we understand, and we are using each of them the way they are meant to be used.

What I worry about is, 50 years of technology development within the Federal Government, where the objective had to do with nuclear energy, defense, health, welfare, pollution, all sorts of things, and we say, there must be stuff in there that is commercializable. It doesn't have to be at all.

Chairman KANJORSKI. What if you know there is? I know there is. I know at least three or four—

Mr. STEWART. Then you have to ask the question, is there enough to warrant the kind of apparatus you are talking about?

Chairman KANJORSKI. Let me give you one. Patent 5 million held by the University of Florida. It is an enzyme worked off of



mutations, and genetically reworked, so that it attacks cellulose, paper, wastepaper, converts it to ethanol at a very low cost, simultaneously in one atmosphere with the bacteria. You put the wastepaper in, put the enzyme and the bacteria in, and out the other side flows ethanol.

Fifty-seven percent of the municipal waste in this country is cellulose, easily separable. Taking that enzyme product and taking that wastepaper, you would probably be able to provide 25 percent of the fuel necessary to drive or mix with gasoline to create an ethanol-gasoline mixture at 50 cents a gallon. That is what it costs to do it. You would make a profit. That is when you get the paper for nothing.

But New York is paying you \$40 a ton to take the paper. They are paying the Chinese to take it. Nobody in America is smart enough to do anything here at \$40 a ton, which surprises me.

That technology has been around for the last 20 years. It is to the point now where they have a patent, they are ready to go. Nobody is doing it anywhere, because it is a high risk, high capital initiative.

I happened to have a hearing in Hawaii this summer, and went to some of the islands. They have two things happening in Hawaii. The sugarcane business is leaving and going to the Philippines. That is the major employer of their farmworkers. And the pineapple groves are shutting down because they can grow them in other areas of the Pacific much cheaper.

So they have massive amounts of land that grow cellulose at the fastest rate of almost anywhere in the world. And they have a large part of the work force that will be unemployed. At the same time, they charge about \$1.70 to \$1.90 for the gasoline that they have to import. They use an awful lot of it, and Honolulu is not the sweetest-smelling city because of it.

It strikes me here you have the natural living circumstances, it grows cellulose, you have a need for fuel, you are importing that fuel today. Why in the world doesn't someone take that technology and move out there and become a manufacturer? And if you are successful, if you are successful, you are now 3,000 or 4,000 miles away from Hong Kong, Tokyo, and Los Angeles and San Francisco, so you are in the most ideal circumstance of location to ship to the ports of the area on the Pacific rim and the Western rim of the United States that need this product, that you could produce certainly in unlimited amounts.

Now, why does that not happen? Well, I happen to know a lot about that business because I have followed this scenario for about 5 years. It was something I was interested in before I came to Congress, and I almost got into the business of buying the patent but decided to run for Congress instead because of the frustration, exactly what we are talking about, 2 years, trying to buy the patent and set it up. Then finally said it would be easier to run and get into Congress.

But I think the thing is, one, the people in the academic world have no idea how to negotiate or set up a deal. To them it is their life's work so they do not want to give it away. They are worried about striking the deal right.

Two, most people in the financial business, when they look at something, it takes, these plants, \$100, \$100 million apiece, they are high capitally intensive. And, of course, we are never sure that the Arabs won't reduce the price of oil to \$2 a barrel, which would destroy the investment. And I have to say that probably the only people that understand that fuel business and could do it are the large oil and gas companies, and the reason they have not is because it is the one segment of the field that would make them monopolistic. So in order to avoid antitrust laws, that is the area they have not gone into, ethanol production.

Now, should an entrepreneur be able to put that together? It seems to me, hell, yes. Should the government be involved? Yes. They should build the plant in the Hawaiian Islands, because if you are successful you take care of the labor problems they are going to have because of the loss of farm work. You clean up the air, and you certainly have to be able to beat the price of gasoline sold in those islands as a very high cost. You would get the government to be part of this.

Will it be done? I do not know. I am working with Senator Inouye, Mr. Abercrombie, and Mrs. Mink on this subject. But it is very difficult to get people to begin; that is a technology that is 20 years in existence. It is not a small business. It is a medium-sized business. It is not big enough for the fat cats on Wall Street to really get excited about because certainly it is not going to be a Microsoft. But it is a brand new technology that would cut the cost of energy, clean air environmentally, and put people to work in an area they are about to go out of work. And all the steps are there, and all it takes is an entrepreneur to do it.

Mr. STEWART. I am on both sides of this one, I have got to tell you that. On the one hand, I am sure things like this do fall between the cracks, aren't brought to market as early as they should be and as well as they should be.

At the same time, an awful lot of money is lost—remember, the failure rates are enormous at these levels of risk, and man, you know it when you go into the business, but it isn't until your first disaster that you really know it, when your decision has resulted in the loss of a million and a half bucks, and you have got to get up the next day and you have got to make another decision about another deal.

And those are qualities that I don't think are spread around among the human race very broadly. You have got to be good at both. You have to be tough as nails and have a head for business and know what it is all about and you have to also understand technology. That is almost two lifetimes of training and experience in one guy. And that is one of the things that makes it tough.

I also think there is a risk—forgive me for rubbing it in—in generalizing from 1, 5, or 10 examples. I think you have to be sure that the—not sure, but the probability has to be that the candle is going to be worth the game. The cost of an enterprise like the one you are describing is not going to be small. By government standards, nobody will notice. You can give it a fair trial for not too much money, I would think. And it is probably worth trying.

Once again, I have got more confidence in the things—well, it is a coward's way out, with the things that have begun to establish

that they can work, and carrying them a little further. So that, for example, to me, phase 3 of the SBIR business is the fishing ground that you should be looking at rather than all the clutter of technology from all over the government. Phase 3 here, a technology entrepreneur has already risked not just the government's money, he has risked his own time, effort, his own company's future. You have got some preconditioning of the whole affair to make you think—to make it more probable that there is a market. I don't think I am adding anything to the discussion. I will shut up.

Chairman KANJORSKI. No, I take your constructive criticism well. I certainly am looking at it.

Mr. Ludlam.

Mr. LUDLAM. You wanted three priorities. I would just comment on your example. I think it is a biotechnology company, and if it is, the collapse of capital markets in the medical field has had an impact on the other elements of biotechnology.

Biotechnology is a rather broad technology which deals with industrial processes, genetic engineered animals, and foods. We are about to get the first whole food to be marketed, the Flavor-Saver tomato. It is genetically engineered. You take out the enzyme, it doesn't rot, and it will stay on your shelf 3 or 4 weeks before it rots. That is another example.

The collapse in the medical field, which is most of the money and the early money and the best developed technology, has damaged the markets for other biotechnology companies.

Pennsylvania is the seventh largest concentration of biotechnology companies in the country: \$270 million in biotechnology in Pennsylvania.

Price controls are our top priority. Two is fixing the venture capital incentive enacted last year. I had seven proposals on that. We are working on a bill to fix it. I will be happy to give you the details.

We have at least three proposals on the R&D credit in terms—three or four proposals in terms of problems for it. The basic problem is that a company needs to have tax liability in order to claim a credit. If they don't have tax liability, which in most cases is true for our companies, the credit is a carryforward.

Chairman KANJORSKI. Do you want the carryforward or do you want to sell it off?

Mr. LUDLAM. Making the credit permanent would be important to start with. A partially refundable credit is something we are working on in terms of the targeted refund. For example, a refund might be only for companies that are small, only for companies that have additional unclaimed R&D credits in the current year, and then the refund would be only up to the amount of the sustained effort in R&D.

You couldn't have effort in the past that has not been sustained. We are trying to target it in a way that won't kill us—

Chairman KANJORSKI. But you will not be able to sell the credit off?

Mr. LUDLAM. Either you could lease it or refund it. Either you could lease or you could refund it.

There is a third proposal, very threatening, which is being considered now by Ways and Means and Finance. That is to reduce



the amount of the R&D credit based upon the spread between the exercise and the grant price on a stock option. They wouldn't count the spread on a stock option as wages for purposes of the R&D credit, so that would be a double hit, not only reducing the value of the R&D credit but reducing the incentive for the stock option, which is particularly disastrous for oil companies.

Those are three. But I will just mention three others in a sentence. There is a problem with net operating losses, section 382. You lose your losses on an NOL—which is often our company's most important asset—if you change ownership, meaning you add new investors. You can lose your NOL's, a big problem with 382.

We have the FASB stock option proposal, to require accounting on the stock options, which will take most of our companies further into the red. And then you have problems with securities fraud suits, where virtually all the entrepreneurial companies, as soon as their stock price drops, which happens to many of them at some point in their life cycle, they immediately get sued for stock fraud for having failed to reveal some material fact that would have warned investors about the prospect of a drop.

Chairman KANJORSKI. The last question you mentioned is the real problem, or the last issue. It is growing at a high rate because of the fluctuation?

Mr. LUDLAM. It is almost automatic. There are now law firms which are entrepreneurial which have decided this is a wonderful way for strike suits against firms. The potential liability is staggering, because they are all class actions. So the incentive to settle it is overwhelming for a firm that has no cash-flow, limited capital, waiting to an FDA approval, facing price controls.

Chairman KANJORSKI. I think you can all agree that we should kill the lawyers.

Mr. Pages.

Mr. PAGES. I will give you something very general, something specific, and then something very specific related to your proposal. First, all I would say, don't reinvent the wheel. There are a lot of good State and local programs. Look at those and try to use those as models, and if possible utilize those programs and expand them nationally rather than creating a new bureaucracy here in Washington.

The second thing I would suggest is look at some way to get funds to companies trying to convert, through defense conversion, any type of program that is going to get working capital to those kind of firms.

My third point is a followup on Mr. Stewart's point in your proposal for the technology network. I think it is important to remember that there is probably not a whole lot of crown jewels in the Federal Government. If they were there in terms of technology, I think the venture community would have found them. But there are a lot of very smart people. So try to link people in, whether this person is an expert on metallurgy—

Chairman KANJORSKI. I should say for Mr. Stewart's benefit that in regard to the NTIS, the Japanese have roughly 21 fully paid people attached to the Embassy that every day do nothing else but go over there and read all of those papers. It is not by chance that they are licensees of 90 percent, the 90 percent of the licenses of

that process. There are very few large American corporations or entities that have that interest, because it is really not their direct interest to spend the money to be out there looking at that process. But go ahead.

Mr. PAGES. I agree you ought to include technologies, but also include people. When you say this person is an expert on metallurgy, they are available to help you, something along those lines to bring it down to earth. That may be something you might want to include in a network proposal.

Chairman KANJORSKI. The other area I wanted to mention to you, the reason we wanted to get the corporate structure was not only to get to the vaults of the government, but also to in my way of thinking, there is no better incentive than the bottom line for private corporations to spin off the patents that they have that they do not intend to sell that are very good, and that they have volumes of them.

And recently in testimony before me, Westinghouse indicated that they had gone through a patent search and identified everything they did not want to develop themselves, and then made it available to—what city was that? Charleston, South Carolina, around one of their major installations. You could have any patent they were not going to use for \$25 if you made a condition to build a plant and do the operation within a radius of that area, which I thought was a nice start.

But then I thought, how many more patents are out there in the private—and there is no market to sell that. There is no—I mean, there is a market for it, obviously, but there is no disbursement of what is out there. The average small businessman, medium-sized company, without spending an inordinate amount of money and doing a single customized search can really find out what is available, and because of proprietary interests and all that, confidentially, it is very difficult to get into that system.

So we were hoping this would also become a marketing tool for the private American companies. But everywhere I go, I go through our laboratories. I went through Bell Labs one time in New Jersey. What a phenomenal amount of material they have that could keep businesses going forever and they just use a very small part of it.

Mr. PAGES. I know that is the case with many of the defense businesses. They do not want to create competitors. If there is some way to introduce incentives to encourage them to license that technology, that would be very useful.

Ms. LEVERE. Create economies of scale for the businesses, for the corporations, and the inventors in the information flow, the infrastructure.

Two, I think capitalize the local financial institutions that serve local needs that can deal with this higher risk gap that exists between venture and capital.

Chairman KANJORSKI. How would you do that? Banks, you mean? Encourage banks to give SBICs?

Ms. LEVERE. Nonbank institutions, but have the communication between the two so you can transition them.

Chairman KANJORSKI. So if we were trying to do a demonstration of this, would you encourage us to identify a few secondary market areas in the country and to establish—

Ms. LEVERE. Where there is technical capacity to serve the businesses with the financial capacity. We have both ingredients in place.

And the third thing I would do, for when they get a little older, because that is where the secondary market is critical, to be able to get long-term, fixed-rate financing, which businesses can't get, you can't finance a building on 30 years.

Chairman KANJORSKI. You are aware of H.R. 2600, I assume?

Ms. LEVERE. A long time with Velda Sue.

Chairman KANJORSKI. Mr. McNeish, the final indictment.

Mr. MCNEISH. Just take any two of the separate recommendations I made in my testimony.

But as a third, I would strongly encourage you to keep banging away at the subject as well as you are doing, particularly with your colleagues in the Congress. This is one of the most enlightened, educational hearings I have been at, and I appreciate the opportunity.

Chairman KANJORSKI. I appreciate that.

In closing, I just want to say, I certainly come from a legal background, and it is a tough business, but I have got to tell you that we do not have—and you know from your experience on the Hill—a real strong business background in either of the two Houses of Congress. And as a result, we are not able to add sometimes those areas that should be clear to anyone else.

One of the reasons I am having the roundtable discussions, and they have really been helpful to us—unfortunately, today we did not get more than the two members and myself present—but it is sort of a learning opportunity. We gained more out of you today than—just to see what is happening in your field. It has really been very helpful when you let your hair down and you are honest with us and you jump in and criticize. I appreciate it.

Mr. Stewart, you cannot hurt my feelings. I have got thick skin. But I appreciate your candor. That is something those of us who sit on this side of the table, we never get. Everybody comes up here—I do not know what they think Members of Congress or Senators are. As President Eisenhower said, "You can appreciate a politician because he puts his pants on one leg at a time like everyone else," except for females. But the point is that there isn't any damn difference between them and anybody else out there. I appreciate the candor.

Mr. STEWART. Mr. Chairman, I just want to second what Peter said. I think one of the things that worries me, I have been a staff man in both Houses, and—so I know politicians really want people to be straight with them. One of our problems still is, how do you organize the Chambers to deal with a subject like this?

You take a look at what we have touched on today—regulation, banking, State and local taxes. Everything—procurement. Everything under the Sun. If we really wanted to have at it from a legislative standpoint, we would be running up and down the Hill for the next 10 years.

Back about a dozen years ago there was a Member from my home State, my native State, New York, Stan Lundine, now the Lieutenant Governor up there, and he had a technology task force of some sort. It may have been only the Democrats, I don't know.



But I have wondered whether we don't need some apparatus within the Chamber so Members can keep enlightening one another about it, because this is a subject matter that has no beginning and no end.

Chairman KANJORSKI. I am trying to—we are moving toward those areas, but our problem is nomenclature. Technology transfer. I recently went out to Cleveland to go through the technology transfer center out there, thinking, they are actually doing something. Little did I realize what they are really doing is what I thought manufacturers' representatives would be doing, that is what it is. That is not technology transfer. That is showing you a machine to do something faster than you are probably doing today. That is improving process and machinery and upgrading. We need that.

But you get from that point and then you go to another agency that a laboratory is trying to sell a new technology and it is all lumped into the one thing called technology transfer.

And, quite frankly, our failure to better identify what this thing is that what we are talking about confuses people. Everybody here. It is like everything else, everybody is for technology transfer, but we do not know what it all means. It is like Democrats, they do not all have the same philosophy but they belong to a disorganized party or something.

Mr. STEWART. Can I have permission to put this in the record from my hometown business newspaper. What this talks about is the actual share of bank loans that go to small business in Arizona. And it made page 1.

Now, they refer in here to a congressional requirement now that this be reported, the share of bank loans that have gone to small companies, and they cite a study by an outfit called Verabank that I never heard of, and apparently this data is available now for the whole country. And I would just like to leave it in the record.

Chairman KANJORSKI. I would appreciate it. Without objection, it will be submitted as part of the record.

[The information referred to can be found in the appendix.]

Chairman KANJORSKI. I have a vote on. I want to thank you very much. I certainly appreciate it.

I would wish any of you that has any information, studies, reports, that you would like us to look at, please not only furnish those, or anything you can do or any ideas you come up with, do not lose sleep at night. Call us, because we want to know. I think we do have a chance to get some cooperation with the leadership and the White House this year to do some of the things we are talking about. So if you have any thoughts of what you think should be done or any critiques of what we are doing that you think should be changed, please do not hesitate.

Thank you very much.

[Whereupon, at 4:45 p.m., the hearing was adjourned.]

## APPENDIX

October 26, 1993

Opening Statement of

Paul E. Kanjorski, Chairman

SUBCOMMITTEE ON ECONOMIC GROWTH & CREDIT FORMATION  
OF THE HOUSE BANKING, FINANCE AND URBAN AFFAIRS COMMITTEE

Hearing on

the Availability of Financing for High-Technology Companies

October 26, 1993

The Subcommittee meets today for the second in a series of roundtable hearings on the potential for stimulating economic growth and new job creation in the United States through Federal technology transfer and private sector commercialization. Today we will be looking at the availability of financing for high-technology companies and entrepreneurs.

In searching for new initiatives to revitalize our economy and encourage new employment opportunities through the commercialization of federally-held technologies, we must ensure that three key components are addressed.

First, do America's small- and medium-sized businesses and entrepreneurs have access to available technologies?

Second, do these businesses have access the technical expertise which may be necessary to successfully commercialize these technologies?

And third, do these businesses have access to the capital necessary to successfully commercialize these technologies?

Today's hearing will focus primarily on this third issue--the availability of capital. Joining us are representatives from several small-business and technology-related organizations involved in analysis of financing for technology transfer and economic conversion efforts.

I would like to thank all of our participants for taking time out of their busy schedules to meet with us, and I welcome them to the Subcommittee. As the witnesses are aware, I have some rather specific thoughts in this area, and am developing legislation to facilitate the commercialization of federally-held technologies. As such, I look forward to today's dialogue.



U.S. HOUSE OF REPRESENTATIVES

SUBCOMMITTEE ON ECONOMIC GROWTH AND CREDIT FORMATION

COMMITTEE ON BANKING, FINANCE AND URBAN AFFAIRS

OCTOBER 26, 1993 2:00 P. M.

STATEMENT BY MILTON D. STEWART

VICE CHAIRMAN & COUNSEL, ACADEMY OF TECHNOLOGY ENTREPRENEURS  
AND INNOVATORS

PRESIDENT, THE SMALL BUSINESS HIGH TECHNOLOGY INSTITUTE

This Subcommittee's topic for this roundtable hearing goes to the heart of one major technology competitiveness issue -- how to maximize the contribution of small technology-based businesses in our national effort.

Let me begin by congratulating the Congress on the steps forward it has already taken. They are not small. From the last Congress:

- The expansion and extension of the Small Business Innovation Research program to the year 2000.
- The much smaller three year Small Business Technology Transfer Pilot program.
- The reformation of the Small Business Investment Company program.

The present Congress will, in my opinion, already go down in history for enacting the two-tier capital gains tax. For thirty years, we have been trying to explain that when a Federal capital gains tax is the same on gains of all kinds -- the government is

\*\* Mr. Stewart is a former Chief Counsel for Advocacy of SBA; Editor of INC. Magazine.

discouraging risk-taking. Why invest in a small immature company with illiquid equities, when whether you win or lose, the tax will be the same as what it will be if you make a much safer investment in a liquid security issued by a large, dividend-paying company which almost surely is much safer?

Another sign of promising action is the fact that a bipartisan majority of the Members of the House are joining to sponsor amendments to strengthen the Regulatory Flexibility Act. (H. R. 830, Ewing, LaFalce, Meyer). In the private sector, the formation of the merit-based Academy of Technology Entrepreneurs and Innovators is a similarly hopeful sign. Now to other needs and how they may be met.

1. The Need:                    A National Strategy for International Technology Competitiveness.

Meeting It:                    "Ramo's Rules" Competitiveness, Technology Entrepreneurs and Small Companies.

"Is there a natural strategy to achieve superiority in technology? I am certain there is. IT IS TO FOSTER TECHNOLOGY ENTREPRENEURSHIP. We produce business entrepreneurs at an enormous rate, but only a small fraction are involved with technology. Yet technology entrepreneurship has been the main force behind our industrial development from the beginning. It is not today at its full power. We can and should accelerate it.

"AN ABUNDANCE OF NEW COMPANIES IS NEEDED TO ADVANCE THE NEW TECHNOLOGIES. They will fill the gaps left by the established companies, with the result that America will excel in the world technology olympics. How then can we accelerate the founding of U. S. high technology companies?

"....."

"WE MUST HELP ENTREPRENEURS FIND SOURCES OF CAPITAL...."

These excerpts are from a book by Dr. Simon Ramo, published five years ago. "The Business of Science," Hill and Wang, 1988 (pp. 246, 247, 258, emphases added.)

Dr. Ramo, the co-founder and former CEO of TRW, has been honored with the National Medal of Science by President Carter, with the Medal of Freedom by President Reagan. Far from being a small business advocate, he served our country in large companies, large government agencies, large universities.

Nonetheless, his book earned him the Franklin-Jefferson Medal of the Small Business High Technology Institute. Its citation said, "every public policy-maker interested in choosing priorities that make sense should know these excerpts. Every public official looking for the things we must do as we fight to bring the deficit down should think about them."

2. The Need:                    Adequate Bank Credit for Small Technology-  
    Companies.
- Meeting It:                    (a) An Immediate SBA Pilot Program of 7(A)  
    Guaranteed Loans for Them.

All small companies today face high hurdles in getting adequate credit from commercial banks. But as a group, none has as much trouble as technology-based businesses. They face a special "cultural" lag problem -- by and large, commercial bank officers are not literate about the technology industries. There is attached as Appendix 1, the text of a letter from David Colvin, President of Triangle Research and Development of North Carolina. Dr. Colvin is an accomplished technology entrepreneur, a successful SBIR competitor who in 1994 will succeed to the Presidency of the Academy of Technology Entrepreneurs and Innovators. Yet his experiences with bank financing are hardly unusual. It is our hope that the members of this Subcommittee and



their staffs will give this letter their close attention.

There are exceptions (c. f. the Bank of Silicon Valley), and a few large banks which have a few technologically educated loan officers who deal with large and mid-sized businesses. In regrettably rare instances, some small banks will still make an old-fashioned "character loan" to some life-time resident technology entrepreneur whom they know very well. (See Appendix 2, Ronan State Bank, Montana)

Technology-based businesses are not barred from the SBA's multi-billion dollar 7(a) guarantee loan program. But they must just as well be. It takes a bank to recommend the loan to SBA, and to take part of the risk.

We need a well-publicized Pilot Program that guarantees 100 to 1000 bank loans to technology-based businesses in each Federal region. (This probably does not even need legislation; a Congressional nudge would surely help.) Educational and information support should be sought from the Robert Morris Associates, the Small Business Committee of the American Bar Association, the Independent Bankers Association and the State Bankers Associations.

Banks can and do learn. Years ago, there were only two commercial banks that made loans to radio station licensees, Society National Bank of Cleveland and the Bank of Boston, if memory serves. When they were successful, the bars came down in other banks. An SBA Pilot Program, if successful, would help in the same way.

We would need regulators and bankers to understand that lending in this area is a national necessity, that the SBA would be sharing the risk, and it wouldn't make much sense always to require repayments of principal before the borrower has time to build a head of business steam -- or always to look for two dollars or even one in real estate collateral for every dollar of unguaranteed debt.

(b) Secondary Markets

The recent reports of a successful secondary market sale of unguaranteed small business bank paper by Merrill, Lynch is of potentially great importance. Chairman Kanjorski's proposed measure H. R. 2600 takes on a new urgency in the light of that offering. If an effective secondary market for technology bank loan paper can be created, it should go a good distance in meeting this need.

(c) Federal Laboratories As a Potential  
Technology Advisory Resource for Banks.

Technology literacy is still a distant goal for most Americans, almost all bank loan officers included. We have speculated about how a reference source could be set up to provide them specialized, current market and other relevant technology data. Given the enormous range of technologies and their continuing and swift breeding of more and more new ones, occasional consultants are of limited value.

As the government explores new missions for the Federal laboratories, it ought to be possible for one or more of them to experiment with developing a bank Technology Advisory Service. If this works, the service could and should become self-sustaining. It might be privatized, permitting labs to out-place a number of their people in view of their coming budgetary cutbacks.

There are a number of alternative ownership forms such a service could assume -- bank-owned cooperative, ESOP etc. This is, I know -- at first blush -- a far out idea. But competent and knowledgeable people might find something useful in it.

(d) Bank Networking With and Investment  
in SBICs.

In the press accounts of the secondary market sale mentioned above, the Chairman of the Federal Reserve Board was quoted as being pleased with the development. We need regulators and examiners to do more of that, to be sensitive to their own importance in meeting the credit needs of small companies in general and technology-based firms in particular. A good number of banks have been successful at owning, even managing and certainly collaborating with Federally-licensed SBICs. Shouldn't examiners be asking banks not learning how to serve small business -- and their own stockholders -- with some form of SBIC or other appropriate relationship why they are not doing so. The net impact of regulation should reflect a balance between reasonable risk and safety. Our colleague here, Peter McNeish has more recent experience than mine. His views would be helpful.

3. The Need: More Individual Investment of Risk Capital  
in Small Technology-Based Businesses.

Meeting It: Encourage Use of New Lower-Rate Capital  
Gains Tax: Improve It Still Further Quickly.

(a) We need a simple set of IRS regulations published soon which add the least possible burden to complying with the new, lower rate for risk-taking long-term investment in small business.

(b) We need a Federal information program about this preferential 14% rate on gains from long-term investment in small firms as against the 28% or normal rate. The five year holding period



will make it seem a remote advantage. This may stretch the normal time it takes for taxpayers and their advisers to feel confident enough with new tax law to use it. A bipartisan information team from government could hasten the effect of the new law.

(c) Tax specialists (our colleague here Charles Ludlam, as an example) believe there are still one or more needless hurdles to be removed from the new law. Others point out how much more quickly the new law's benefit would be felt if, for example, a "reinvestment" or "rollover" credit could be added. The normal capital gains tax would be deferred if, for example, proceeds of the sale of a large company's liquid (publicly traded) securities were reasonably promptly reinvested -- this time in the riskier (probably illiquid) security of a small company. The realized gain would be reflected in the tax basis of the newly purchased small company security. The holding period could also begin immediately. That would make the effect on small innovative companies come more quickly and generally.

There would be a revenue loss (and a partial deferment) which may be unacceptable in a period of serious budget deficit. But Chairman Kanjorski has already and properly suggested an acceptable alternative revenue source -- closing the transfer pricing loophole.

4. The Need:                    A Realistic, Useable, Yardstick for a Fair and Adequate Small Business Share of Federal Research and Development Procurement from Industry.

Meeting It: Federal Utilization of Small Business in R and D Should Result In a Share of Total Federal R and D No Smaller Than the Share of Private Sector R and D Currently Done By Small Business.

We believe Federal procurement of R and D has a favorable impact on the formation of small companies (see below). How large a share of Federal research and development procurement from industry should then be going to small companies to make proper use of their innovative abilities?

The best single source of information to help answer that question is an annual report prepared by the National Science Foundation's Science and Engineering Activities Program of its Division of Science Research Studies ("Selected Data on Research and Development in Industry: 1991" NSF 92-322.) The study is based on data collected for NSF by the Bureau of Census in an annual "Survey of Industrial Research and Development."

The key data (Appendix 3: NSF Table SD-4) show that in the private sector, companies with fewer than 500 employees now do about 10% of corporate and other privatization research and development. (Table SD-4) That is almost twice the share of such work which was done by that size-class of companies ten years ago. As against that, the small business share of Federal procurement research and development from industry (Appendix 4: NSF Table SD-6) was less than 4%. The legal definition of "small business" R and D companies used by SBA is the same 500 or fewer employees.

These data show that Federal R and D procurement from industry almost surely fails to contribute adequately to technology innovation when the share that goes to small business is below the share that small business performs in the private sector that is likely to be the result.

To illustrate the impact of the proposed yardstick, Appendix 5 shows what it would have meant over the ten year period 1981-1991. Small business actually got a little more than 8 billion dollars of more than 238 billion Federal R and D dollars that went to industry, If the small business Federal share had been the same percentage as its private sector in each year, it would have meant more than 25 billion dollars over the ten years or 9% as against the actual 3%.

And it would make great sense to make the small business Federal target during the next five years 9% of the industry R and D total.

This is a data-based definition that makes sense to me. It should apply to every agency with a significant R and D program, as well as to the Federal government as a whole. If the small business share of its industry R and D contracts, grants and cooperative agreements for industry is below 9%, the agency should be working to increase it to that level. There are assumptions in this hypothesis; now let's make them explicit because they are not arbitrary, they are based on data, experience and common sense.

First, the private sector is a far more competitive place for R and D than the Federal market. Competitive pressures are fierce, whether the issue is innovation, product durability or cost. Market life for new consumer and producer products has been, in the years covered by these data, growing shorter and shorter. That has intensified the drive for innovation, reflected in the rise of the level of small business utilization between the first and second half of the 1980s.

These were also the years in which the cold war was ending and large companies' downsizing began. Large companies found that "distributed R and D" -- use of large numbers of small, specialized companies, was often more effective than trying to keep up with explosive numbers of new technologies from one large in-house facility. Flexible small companies can change more rapidly and cheaply than either big business or big government with their large overhead and unwieldy review committees.

Second, small firms are likely to make more frequent innovations than large firms and may even get them to market faster. (This does not mean that large companies, universities and Federal laboratories never make industrial innovations.) Dr. Ramo explains why it is harder for them to innovate than small companies in The Business of Science. It is only small companies which can "bet the farm" on a new technology. Research data generally confirming this view was reported in the sixties and seventies in research sponsored by SBA.

Third, Federal procurement is an important source of cash flow, and an important stimulator of capital formation for new small R and D companies. Two years ago, 300 SBIR winning firms responded to a survey conducted by the Small Business High Technology Institute. They were asked whether the existence of the SBIR program (about nine years old then, as a statutory program) had been wholly, partly or not at all responsible for the formation of their companies. One-fourth replied that it had been -- eight per cent said it had been wholly responsible; seventeen per cent said the SBIR program had been partly responsible.

Fourth, taxpayers have a stake in how big a share small companies have in Federal R and D procurement from industry. Appendix 6 (Table SD-15 in the NSF Report cited above) (NSF 92-322) confirms that firms



with fewer than 500 employees are able to hire and use R and D scientists and engineers for significantly less money than larger firms. This has been the case in each of the last ten years.

Federal research and development budget-making is far too much made by all the advocates for performer groups simply chanting "more for us," and political compromises then made to quiet them.

We would all be better off, and so would the country, if all the advocates made plain the point at which they would stop asking for more, and if it were a predictable point. That is what I think I have offered here. The Federal R and D to industry arena should give small companies roughly the same share and room for innovation as the private sector does. That, I am convinced, would be best for government and taxpayers. This is not meant to be an "iron law" or a formula that responds to every half-percentage change in the private sector. It is meant to be what I have called it -- a yardstick.

The Federal government should, if anything, pioneer more technology innovation to bring down costs in areas where it imposes large burdens on the taxpayer -- defense, health, the environment, civilian transport infrastructure. That is where it has the greatest obligation to seek and use the most cost effective agents of beneficent innovation. These may not always be small companies but they are likely enough to be to warrant a measurable effort to include them. For the next several years, this 9% yardstick would be an appropriate measure of that effort. If and when the small business share of the private sector R and D changed sharply -- say by two or three per cent in either direction, the yardstick would be adjusted.

5. The Need: More Large Company Effort to Seek Out, Identify and Respond Favorably to SBIR Winners Who Need Phase III Commercialization Partners.
- Meeting It: Provide a Specific Added Incentive to the R and D Tax Credit.

(a) As the SBIR program expands, most participating government agencies are pressing SBIR competitors harder to find early commercial partners for Phase III. An increasing number are now asking for contingent commitments as a condition of making Phase II award.

Every topic in the SBIR competitions is chosen by a Federal agency; every SBIR award and the research done with it may be presumed to be in the public interest. It would seem entirely appropriate to provide an incentive to potential Phase III partners beyond the present R and D tax Credit. Some premium, beginning with 20% more than the "normal R and D credit", would be one way to do it. Comptrollers of large and midsize companies might then encourage operating people to seek out (or respond more quickly) to SBIR winners' proposals. Apart from the public purpose, the premium would be justified by the large company's risk.

(b) The SBIR program's definition of "commercialization" expressly includes government as a market. That should mean that those selecting topics expected to lead to government contracts ought to have a firm basis for believing that successful accomplishment of Phases I and II will really lead to government procurement in Phase III.

Admittedly, requirements change over time and you cannot always be sure that the research result will fit the government need. But more and more accountability, education and incentive is needed to make the agencies work better, if possible, to improve the batting average of their government topic-choosing personnel. Clearly this ought to be an element in determining individual performance ratings, and even promotions. It may be desirable to pay an occasional bonus for outstanding performance in proposing topics which result in government Phase IIIs. At a minimum, agency heads should be sure that SBIR topic-choosers and buying decision-makers stay in touch with one another.

6. The Need:                    Fairness and Realism in Federal R and D Cost-Sharing.
- Meeting It:                An Amendment to the Small Business Act Is Needed Setting a Government-Wide Policy on Cost-Sharing in R and D Procurement Which Requires Relating Small Business' Burden To Its Size.

Increasingly, Federal R and D programs are requiring cost-sharing by successful proponents and competitors. At the present time, that is true of the Department of Commerce NIST's Advanced Technology Program, the Department of Defense in its TRP Program, the Department of Energy, both in its laboratories and in Phase II of its SBIR program. Where most of these cost-sharing requirements are specific; they require 50% of the cost to be borne by the private company. These requirements make no distinction as to the obligation of small, mid-sized or large companies. Whether you have 5, 50, 500, 5000 or 50,000

employees, the same 50% applies.

This is "equal treatment" like the famous "equality of the rich and poor to starve under the bridges of Paris." It is not equality at all. It effectively bars the bulk of small firms from participating in these programs since the costs to be shared are far beyond their resources. Are there no exceptions? Of course, there are -- companies with just under 500 employees may have the resources or the ability to borrow them. There may be a rare project so small its costs can be shared.

"Can't the small company team up with a big one that can put up the amount to be cost-shared?" Certainly, and some have and will. But that should not be a course implicitly required by the government or pushed by it. If the small company has a proposed solution or project, it may want to defer partnering it until it is worth more.

Is it unreasonable of the government to ask for cost-sharing as an evidence of strength of private company commitment? Not when the amount proposed is consistent with the ability of the private company to pay. Is it not prudent and responsible in a time of deficit for a Federal agency to try to get the cost of the project shared? Not when it is a self-defeating requirement that excludes small companies which are traditionally the least costly performers, and the ones most likely to come up with the least expensive innovations.

One possible solution is to have 50% cost-sharing apply for companies with 500 or more employees -- companies that are not legally small businesses. For small businesses hearings and research would



determine whether, for example, a sliding scale would work. It might turn out, for example, that no cost-sharing is feasible for firms with under 100 employees, that 10% may be feasible for companies with between 100 and 200, 20% for those with 200 to 300, 30% for those with 300 to 400 and 40% for those with 400 to 500.

R and D proposals to the government present a cost for everyone; for the smallest companies, it is a heavy enough cost to be proof of commitment.

What is most important here is not to deny the government the benefit of brilliance from even the smallest reasonably competitive proposals. The present practice is discriminatory by definition -- "if you can't afford to cost-share, don't bother to apply" and that really means "small business don't apply".

Our view of the industrial innovation process is illustrated in Appendix 7 -- the logo of the Academy. Universities, large companies, commercial banks and venture capital pools, independent professionals, small businesses -- all six have interdependent roles to play in the process. This hearing is essentially about ways in which government can make the process easier and more productive for other participants, particularly small companies.

Some of the suggestions made are the direct business of this Subcommittee, its parent and that Committee's Senate partner. Others would have to be dealt with by among others, the Committees on Small Business of both Houses; their Committees on Space, Science and Technology, the Ways and Means Committee of the House and the Senate Finance Committee, the Armed Services Committees and other procurement-involved committees.

Yet whether directly or indirectly, each of the suggestions

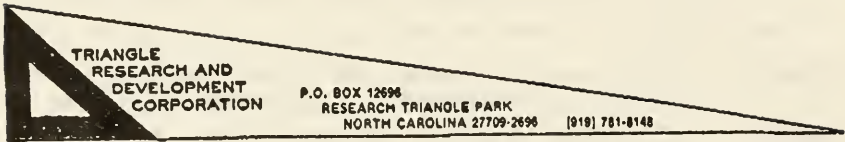
is relevant to capital formation and credit for small technology-based companies. Federal banking policy and regulations, tax policy, procurement policy -- all contribute to making that capital formation and credit easier or harder to come by.

We are also following the Chairman's wise lead with his useful suggestions about an alternative revenue source and access to Federal technology and information about it. It may take a little extra thought to see it, but they too affect the climate for capital and credit. We hope the other Committees will pick up their share of this broader view.

APPENDIXES

- Appendix 1: Letter on Banking Problems from Dr. David P. Colvin,  
President, Triangle Research & Development, NC 10/22/93
- Appendix 2: Article from Lake County (MT) Leader -- Jore Inc.  
September 19, 1993
- Appendix 3: Table SD-4 of NSF 92-322 and Computations Based on It.
- Appendix 4: Table SD-6 of NSF 92-322 and Computations Based on It.
- Appendix 5: Ten Year Result (1981-1991) of Applying Yardstick.
- Appendix 6: Table SD-15 of NSF 92-322-- Cost of R and D Scientists  
and Engineers By Industry and Size of Company.
- Appendix 7: Model of U. S. Industrial Innovation Process  
Logo of Academy of Technology Entrepreneurs & Innovators

## Appendix 1



October 22, 1993

Milton Stewart  
Academy of Technology Entrepreneurs and Innovators  
346 W. Georgia Ave.  
Phoenix, AZ 85013

Dear Milton:

This letter is in response for your request for details of our experiences and recommendations about banking needs that we have. I hope that this information will be of help to you in presenting the needs of companies such as ours.

As you already know, the Small Business Innovation Research (SBIR) program is only ten years old, but has already made a profound impact upon startup new high technology business. For the SBIR reauthorization and expansion legislation in Congress, the GAO studied the technology spinoffs resulting from the SBIR program and concluded that over 25% of these technologies were successfully moving to Phase III commercialization. Typically, big businesses such as Dow Chemical feel good about getting 2-3% of their R&D expenditures into new products. Universities and non-profits are much lower - typically less than 0.1-0.5% of their R&D result in new businesses or products. Small business is also a net jobs creator, whereas large business is fast becoming a net jobs loser. It is imperative that both legislative and financial barriers be minimized in order for to facilitate small high technology businesses to bring more competitive new products into the marketplace.

After founding Triangle Research and Development Corporation (TRDC) in 1979, my wife and I worked out of the basement of our home for the first 7 years. Our first 11 SBIR programs - ranging from new coolants for NASA to implant therapy for lung cancer - were conducted from there. We have now grown to 15 employees in a 10,000 sq.ft. facility and both of these programs along with about 20 others have already moved to Phase III commercialization either through one of our two spin-off corporations or through our numerous licenses and joint ventures with companies such as Lockheed and McDonnell-Douglas. While TRDC has indeed won more than 50 SBIR grants and contracts from six federal agencies (DOD, NASA, HHS, DOT, NSF and DOEd) totalling almost \$7 million, it is the fact that we have carried most of them to Phase III commercialization that I am most proud. This is what counts and what the SBIR program is really all about. Getting our financial institutions to recognize and understand this achievement is another matter altogether.



## Appendix 1

It is essential that a company such as ours have an adequate line of credit at the bank. Government contracting requires that you expend the monies months before you can expect to receive payment. Ramp-up contract costs at the beginning of a multimillion dollar Phase III commercialization program can easily approach \$100,000 before you receive your first check. In addition, at the end of a contract, federal agencies sometimes typically withhold the final payment of 10-20% until a Defense Contracting Auditing Agency or DCAA audit is completed. We have already had five of these audits this year and will likely have another before 1994. We are currently working on 6 SBIRs, five of which are Phase IIs, along with multiple Phase III efforts. When we recently visited our current bank of 8 years to request a 50% expansion of our credit line (which hasn't changed over that period), we were told to find another bank and we had only 60 days to do so. Besides their inherent fear of government contracting, this bank is really looking for our company to rapidly build its asset base; e.g., its buildings and equipment. Since TRDC wants to partner or joint venture with other established companies to provide the manufacturing and marketing, this philosophy is totally incompatible with theirs. Besides their inflexibility, I believe that this incident also shows how much respect and credit are given to high technology companies such as ours by traditional banking.

Leaders in the traditional North Carolina banks are of very little help to emerging high technology businesses. These banks are used to handling agricultural, car and real estate loans where they can both see, get their arms around the subject, or repossess. Lower technology loans are a little harder, but the markets are already established, therefore the bankers have less of a learning curve and feel more comfortable to provide necessary growth capital. High technology financing is quite another matter. While our bankers give lip service to it, but I'm convinced that they are uncomfortable in fields that they do not understand. In addition, since SBIR involves the federal government and contracts, it makes the banks even more afraid.

It has been my experience that you either grow too little or not at all with traditional banks or sell your soul to the venture capitalists; there is currently little or nothing in between. Financial "angels" are hidden assets and you have to wait for them to find you. Traditional banking is really not interested in risk-taking and perhaps their regulatory restrictions do limit their involvement. However, that doesn't solve the problem of capital availability to growing and successful small high technology businesses. Lending decisions are now based upon the personal assets of the owners (property, cars, etc.), putting young entrepreneurs at a special disadvantage.

There is currently a great need to develop useful incentives for investment in high technology small business. These involve higher risk and are more difficult to manage than lower technology because of marketing and financing requirements. New technologies and products usually require the development of new markets instead of the extension of existing ones. Since there is a large gap in the financing opportunity between the traditional bank and venture capital, it may be more effective to create a new type of institution that would have different regulations with higher rates of return. With low interest rates now available, there may be a good opportunity now to create just such an entity. There would, of course, be higher risk for investors, but there is also high risk in state lotteries.

Our state economic development efforts have not been of much help either. Like many other states, North Carolina is good at starting well-meaning programs and institutions, giving lip

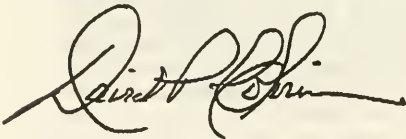
## Appendix 1

service to growth in small business, but it is not so good at implementing meaningful programs that result in needed support for legitimate "risk-taking" enterprises who struggle to make things work and bring new products to market. Most of the efforts of our state commerce department are apparently tied up in chasing "buffalos" and foreign companies to give us the assistance that we really need. A real commitment from our state to help these high technology small businesses, to recognize their value, and to showcase the results and new products from these "home-grown" new companies could make a tremendous difference. These could potentially include state-backed credit lines for government contracting, partial matching funds for SBIR Phase II programs, low-interest loans or grants to qualified small businesses to assist with bringing out their new products, and a state-sponsored "showcase" at the legislature to educate them as to the new products and businesses that programs such as the SBIR are already bringing to North Carolina.

Getting such legislation through state government requires much education and time. Since the SBIR program is a national program, it will probably be more efficient to implement an effective assistance program at this level. Last July, you and a number of us were invited to meet with Mr. Erskine Bowles at the SBA in Washington to discuss this problem along with other SBIR/SBA problems. Mr. Bowles was very attentive; his assistant, Bill Combs, also met with us again last week at a annual meeting of our national academy (the Academy of Technology Entrepreneurs and Innovators) in Washington, and we are hopeful that additional credit will be made available to SBIR Phase II winners who have already gone through numerous peer and agency reviews and now have to submit plans for follow-on commercialization. As you know, we were also approached by an investor who wants to form a SBIC aimed at Phase II SBIR winners. Most of these approaches are probably long-range, however; we also need to have credit or financing that is sooner rather than later.

To assist high technology small business with their financial needs as outlined above and in a most timely manner, I believe there needs to be automatically available an SBA-backed credit line for Phase II SBIR awardees at their banks. Banks should also be encouraged at the highest level to participate in such a program. Interest rates should be at prime or up to 1% over prime to encourage participation and Phase III commercialization and the credit line should be for a significant fraction (30-50%) of the Phase II SBIR award. If you have further questions, please do not hesitate to ask.

Sincerely,

A handwritten signature in dark ink, appearing to read "David P. Colvin". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

David P. Colvin, Ph.D.  
President

## New help for arthritis victims

# Implant puts Jore Inc. in the big leagues

by Dixie Miller  
of the Leader

RONAN — Arthritis patients around the world may soon be able to walk a little better because of the efforts of a local company.

Last year, Jore Incorporated developed a magnetic implant to help alleviate the often-excruciating pain that goes with severe arthritis.

Company officials recently returned from a "very successful" meeting with the Chicago-based Baxter Corporation, one of the largest medical companies in the world, said Jore Incorporated president Marj Jore.

Jore Incorporated also expects to hire around 30 employees in the next year in its tool division. The company already has 25 fulltime payroll employees in that area.

The medical side of the business is where things are about to heat up. "We have the potential to employ hundreds of people. The big, big explosion in employment is at the

two to five-year level," Jore said.

The new magnetic implant replaces the lost cushion that articular cartilage provides at arthritis victims' joints with a "force field" weight-bearing system. The force field is caused by a cross joint configuration using neodymium magnetic material. This material is specially configured by Jore Incorporated to bear weight, said Jore.

Five minutes after the implant is in, the patient can walk without pain, Jore said. "It's pretty remarkable. We anticipate a huge success," he said. There are approximately 19 million patients worldwide who could benefit, he added.

Required Food and Drug Administration animal testing will begin on the implant within the next few weeks, Jore said. The tests are expected to take place in Washington. Sheep will be used for the experiment.

Jore himself will become the first person to test the invention next June. "I want to be the first one to test my own product," he explained.

The company has also developed a new syringe that could potentially capture a large percentage of the market. This new, disposable item protects health care workers by extracting its needle inside itself after an injection, Jore said.

"We've got a ways to go," he said. But the company is looking at gearing up to produce 20 million one-time use syringes a month.

"Our goal is to provide some good-paying jobs," he said. He stressed that the only impact the company wants to have on the Mission Valley is a positive one.

"We really want to help the community. We want to work with the Tribes, we want to work with all the adventure people in the area."

Those adventuresome types include officials at Roman State Bank who hung with the company through some lean early years, he said. "We're appreciative of the hometown effort those guys have shown us."

Lake County MT Leader, Sept. 16, 1993

Table SD-4. Company and other (except Federal) funds for Industrial R&amp;D performance, by Industry and size of company: 1981-91

Industry and size of company	SIC code	(\$Dollars in millions)											Page 1 of 2		
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991			
Total.....		\$35,428	\$40,105	\$44,588	\$51,404	\$57,043	\$59,932	\$61,403	\$65,772	\$70,562	\$73,980	\$76,938			
Distribution by industry															
Food, kindred, and tobacco products 1/.....	20-21	636	777	824	1,081	1,136	1,280	1,204	1,192	1,284	1,308	1,360			
Textiles and apparel.....	22-23	116	136	150	182	218	246	243	210	(S)	242	215			
Lumber, wood products, and furniture.....	24-25	161	159	152	143	147	144	137	156	172	183	160			
Paper and allied products.....	26	566	566	552	594	576	538	604	664	686	730	715			
Chemicals and allied products.....	28	5,205	6,197	6,792	7,736	8,310	8,664	9,445	10,573	11,383	12,277	13,094			
Industrial chemicals.....	281-82, 286	2,393	2,810	2,828	3,057	3,281	3,374	3,531	3,763	3,960	4,272	4,350			
Drugs and medicines.....	283	2,064	2,473	2,896	3,310	3,481	3,657	4,095	4,743	5,164	5,366	6,098			
Other chemicals.....	284-85, 287-89	747	914	1,068	1,369	1,548	1,633	1,819	2,067	2,259	2,638	2,646			
Petroleum refining and extraction.....	13-29	1,780	2,003	2,074	2,245	2,194	1,971	1,883	1,923	2,050	2,113	2,235			
Rubber products.....	30	598	617	638	671	659	655	596	635	678	730	694			
Stone, clay, and glass products.....	32	411	472	586	705	825	941	985	826	863	894	895			
Primary metals.....	33	702	711	701	683	730	786	711	642	715	801	819			
Ferrous metals and products.....	331-32, 3398-99	415	426	396	357	323	336	249	257	254	245	244			
Nonferrous metals and products.....	333-36	287	285	305	326	407	450	462	385	461	556	575			
Fabricated metal products.....	34	545	565	634	773	780	800	633	687	664	644	626			
Machinery.....	35	6,124	7,227	7,911	9,312	10,721	10,701	10,577	11,992	13,478	13,780	14,034			
Office, computing, and accounting machines.....	357	3,847	4,944	5,634	7,011	8,418	8,380	8,193	9,371	10,780	11,073	10,527			
Other machinery, except electrical.....	351-56, 358-59	2,277	2,283	2,277	2,301	2,303	2,321	2,384	2,621	2,698	2,707	3,507			
Electrical equipment.....	36	6,409	6,682	8,158	9,037	9,271	9,767	10,449	11,061	11,641	12,131	12,455			
Radio and TV receiving equipment.....	365	358	364	324	362	350	133	139	139	84	93	78			
Communication equipment.....	366	2,975	3,555	4,500	5,147	5,174	5,117	5,455	5,675	5,820	5,932	6,232			
Electronic components.....	367	1,212	1,342	1,810	2,354	2,826	3,357	3,630	4,068	4,458	4,709	4,726			
Other electrical equipment.....	361-64, 369	1,864	1,421	1,524	1,174	921	1,160	1,225	1,179	1,279	1,397	1,419			
Transportation equipment.....	37	7,739	8,621	8,991	10,406	12,092	13,567	13,462	14,162	15,083	14,992	15,874			
Motor vehicles and motor vehicles equipment.....	371	4,219	4,321	4,754	5,384	6,164	7,171	7,167	7,769	8,725	8,548	8,998			
Other transportation equipment.....	373-75, 379	80	114	227	258	270	330	356	370	353	304	288			
Aircraft and missiles.....	372, 376	3,440	4,186	4,010	4,764	5,649	6,066	5,939	6,023	6,005	6,140	6,588			

See explanatory information and SOURCE at end of table.



## Appendix 3

Table SD-4. Company and other (except Federal) funds for industrial R&amp;D performance, by industry and size of company: 1981-91

Industry and size of company Distribution by industry	SIC code	[Dollars in millions]										Page 2 of 2	
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	
Professional and scientific instruments.....	38	\$2,978	\$3,407	\$3,816	\$4,211	\$4,622	\$4,752	\$4,950	\$5,306	\$5,630	\$6,095	\$6,521	
Scientific and mechanical measuring instruments...	381-82	1,235	1,363	1,605	1,671	1,596	1,521	1,598	1,710	1,858	2,086	2,143	
Optical, surgical, photographic, and other instruments.....	383-87	1,743	2,044	2,211	2,540	3,026	3,231	3,352	3,596	3,772	4,009	4,378	
Other manufacturing industries 1/.....	27,31,39	411	493	525	373	361	380	380	383	400	472	414	
Nonmanufacturing industries.....	10-11,14-17,40-42,44-51,53-54,56,60,62-63,72-73,78,806-07,87	1,048	1,472	2,084	3,252	4,401	4,740	5,144	5,360	5,620	6,568	6,827	
Distribution by size of company [Based on number of employees]													
Less than 500 2/.....		1,880	2,411	3,781	3,781	5,127	6,203	6,200	(S)	(S)	(S)	(S)	
500 to 999 3/.....		N/A	N/A	N/A	1,341	1,531	1,765	1,610	1,517	1,660	1,836	1,711	
1,000 to 4,999.....		2,586	3,241	3,438	4,618	5,249	6,243	6,281	6,441	6,646	6,827	7,125	
5,000 to 9,999.....		2,369	2,224	2,080	2,764	3,350	3,455	3,753	4,322	4,815	5,883	6,439	
10,000 to 24,999.....		5,537	6,448	7,228	8,546	8,366	8,459	9,681	9,668	8,948	9,936	11,633	
25,000 or more.....		23,056	25,781	28,061	30,354	33,421	33,778	33,878	37,438	41,860	42,242	42,172	

1/ Until 1984, tobacco products (SIC 21) was included with "other manufacturing industries."

2/ Until 1984, data represent companies with less than 1,000 employees.

3/ See footnote #2

(D) Data have been withheld to avoid disclosing operations of individual companies.

(S) Data have been withheld due to imputation of more than 50 percent.

N/A Not available

NOTE: Company funds include all funds for industrial R&D work performed within company facilities from all sources except the Federal Government. The sources of funds may comprise those from outside organizations such as research institutions, universities and colleges, other nonprofit organizations, other companies, and state governments, as well as companies' own. Company-financed R&D not performed within the company is excluded.

SOURCE: National Science Foundation/SRS, Research and Development in Industry: 1991

Appendix 3  
NSF R & D Table Percentages

Table SD-4: Company and other (except Federal)  
funds for industrial R&D performance<sup>1</sup>

	Table Value	Percent Share of Year
Group 1 <sup>2</sup> 1981:	1,880	5.31
Group 2 1981:	0	0.00
Group 3 1981:	2,586	7.30
Group 4 1981:	2,369	6.69
Group 5 1981:	5,537	15.63
Group 6 1981:	23,056	65.08
Total -- 1981:	35,428	
Group 1 1982:	2,411	6.01
Group 2 1982:	0	0.00
Group 3 1982:	3,241	8.08
Group 4 1982:	2,224	5.55
Group 5 1982:	6,448	16.08
Group 6 1982:	25,781	64.28
Total -- 1982:	40,105	
Group 1 1983:	3,781	8.48
Group 2 1983:	0	0.00
Group 3 1983:	3,438	7.71
Group 4 1983:	2,080	4.66
Group 5 1983:	7,228	16.21
Group 6 1983:	28,061	62.93
Total -- 1983:	44,588	
Group 1 1984:	3,781	7.36
Group 2 1984:	1,341	2.61
Group 3 1984:	4,618	8.98
Group 4 1984:	2,764	5.38
Group 5 1984:	8,546	16.63
Group 6 1984:	30,354	59.05
Total -- 1984:	51,404	
Group 1 1985:	5,127	8.99
Group 2 1985:	1,531	2.68
Group 3 1985:	5,249	9.20
Group 4 1985:	3,350	5.87
Group 5 1985:	8,366	14.67
Group 6 1985:	33,421	58.59
Total -- 1985:	57,043	

<sup>1</sup>Tables SD-4 and SD-6 are from "Selected Data on Research and Development in Industry 1991, NSF 92-322.

<sup>2</sup>Groups are based on size of company in number of employees:

Group 1	Less than 500
Group 2	500 to 999
Group 3	1,000 to 4,999
Group 4	5,000 to 9,999
Group 5	10,000 to 24,999
Group 6	25,000 or more

## Appendix 3

## NSF R &amp; D Table Percentages

	Table Value	Percent Share of Year
Group 1 1986:	6,203	10.35
Group 2 1986:	1,765	2.94
Group 3 1986:	6,243	10.42
Group 4 1986:	3,455	5.76
Group 5 1986:	8,489	14.16
Group 6 1986:	33,778	56.36
Total -- 1986:	59,932	
Group 1 1987:	6,200	10.10
Group 2 1987:	1,610	2.62
Group 3 1987:	6,281	10.23
Group 4 1987:	3,753	6.11
Group 5 1987:	9,681	15.77
Group 6 1987:	33,878	55.17
Total -- 1987:	61,403	
Group 1 1988:	6,386	9.71
Group 2 1988:	1,517	2.31
Group 3 1988:	6,441	9.79
Group 4 1988:	4,322	6.57
Group 5 1988:	9,668	14.70
Group 6 1988:	37,438	56.92
Total -- 1988:	65,772	
Group 1 1989:	6,633	9.40
Group 2 1989:	1,660	2.35
Group 3 1989:	6,646	9.42
Group 4 1989:	4,815	6.82
Group 5 1989:	8,948	12.68
Group 6 1989:	41,860	59.32
Total -- 1989:	70,562	
Group 1 1990:	7,256	9.81
Group 2 1990:	1,836	2.48
Group 3 1990:	6,827	9.23
Group 4 1990:	5,883	7.95
Group 5 1990:	9,936	13.43
Group 6 1990:	42,242	57.10
Total -- 1990:	73,980	
Group 1 1991:	7,858	10.21
Group 2 1991:	1,711	2.22
Group 3 1991:	7,125	9.26
Group 4 1991:	6,439	8.37
Group 5 1991:	11,633	15.12
Group 6 1991:	42,172	54.81
Total -- 1991:	76,938	

## Appendix 4

Table SD-6. Federal funds for industrial R&amp;D performance, by industry and size of company: 1981-91

Industry and size of company	SIC code	Dollars in millions										Page 1 of 2		
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991		
Total.....		\$16,382	\$18,545	\$20,680	\$23,396	\$27,196	\$27,891	\$30,752	\$32,117	\$31,292	\$30,626	\$25,308		
Distribution by industry														
Food, kindred, and tobacco products 1/.....	20, 21	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	0	
Textiles and apparel.....	22, 23	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	
Lumber, wood products, and furniture.....	24, 25	0	0	0	0	0	0	0	0	0	0	0	0	
Paper and allied products.....	26	(D)	0	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	0	
Chemicals and allied products.....	28	421	407	393	191	230	179	190	199	83	67	89		
Industrial chemicals.....	281-82, 286	409	396	386	183	217	178	185	196	79	65	83		
Drugs and medicines.....	283	(D)	(D)	(D)	(D)	(D)	1	(D)	3	(D)	(D)	(D)		
Other chemicals.....	284-85, 287-89	(D)	(D)	(D)	(D)	(D)	0	(D)	0	(D)	(D)	(D)		
Petroleum refining and extraction.....	13, 29	(D)	(D)	(D)	(D)	(D)	(D)	14	21	(S)	(S)	10		
Rubber products.....	30	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)		
Stone, clay, and glass products.....	32	(D)	(D)	(D)	(D)	(D)	9	10	(D)	(D)	(D)	(D)		
Primary metals.....	33	176	276	384	(D)	(D)	(D)	19	21	34	(D)	17		
Ferrous metals and products.....	331-32, 3398-99	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1	(D)	(D)	(D)		
Nonferrous metals and products.....	333-36	(D)	(D)	(D)	10	9	(D)	8	(D)	20	(D)	(D)		
Fabricated metal products.....	34	80	60	67	69	49	95	150	142	135	134	130		
Machinery.....	35	694	851	1,116	1,192	1,495	(D)	(D)	(D)	1,157	916	1,055		
Office, computing, and accounting machines.....	357	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)		
Other machinery, except electrical.....	351-56, 358-59	(D)	(D)	(D)	(D)	(D)	(D)	75	44	98	(D)	(D)		
Electrical equipment.....	36	3,920	4,241	4,523	4,741	5,161	5,213	5,399	5,181	5,288	5,592	4,824		
Radio and TV receiving equipment.....	365	(D)	(D)	(D)	(D)	(D)	0	0	0	0	0	0		
Communication equipment.....	366	1,733	2,284	2,798	3,538	4,223	4,552	4,729	4,621	4,719	4,838	4,212		
Electronic components.....	367	361	398	359	477	559	(D)	656	539	532	723	595		
Other electrical equipment.....	361-64, 369	(D)	(D)	(D)	(D)	(D)	(D)	14	21	37	31	17		
Transportation equipment.....	37	(D)	(D)	(D)	(D)	(D)	(D)	17,708	20,784	22,176	21,761	21,027	16,217	
Motor vehicles and motor vehicles equipment.....	371	587	476	564	673	820	(D)	(D)	(D)	(D)	(D)	(D)		
Other transportation equipment.....	373-75, 379	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)		
Aircraft and missiles.....	372, 376	8,528	10,265	11,396	14,094	16,582	14,984	18,519	19,877	19,633	19,216	15,104		

See explanatory information and SOURCE at end of table.



## Appendix 4

Table SD-6. Federal funds for industrial R&amp;D performance, by industry and size of company: 1981-91

Industry and size of company Distribution by industry	SIC code	[Dollars in millions]										Page 2 of 2	
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	
Professional and scientific instruments.....	38	\$637	\$523	\$450	\$391	\$391	\$351	\$272	\$120	\$113	\$99	\$100	
Scientific and mechanical measuring instruments...	381-82	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(S)	(S)	(S)	(S)	
Optical, surgical, photographic, and other instruments.....	383-87	(D)	(D)	(D)	(D)	(D)	(D)	(D)	96	103	89	93	
Other manufacturing industries 1/.....	27, 31, 39	(D)	(D)	(D)	(D)	(D)	2	(D)	(D)	(D)	(D)	(D)	
Nonmanufacturing industries.....	10-11, 14-17, 40-42, 44-51, 53-54, 56, 60, 62-63, 72-73, 78, 806-07, 87	858	1,000	1,253	1,653	2,313	2,706	2,700	2,753	2,666	2,666	2,815	
Distribution by size of company													
[Based on number of employees]													
Less than 500 2/.....		424	523	641	621	739	868	963	864	987	975	928	
500 to 999 3/.....		N/A	N/A	N/A	98	117	137	115	139	105	(S)	(S)	
1,000 to 4,999.....		562	623	740	902	991	1,229	981	1,157	1,050	959	931	
5,000 to 9,999.....		619	527	718	487	672	796	748	914	811	280	154	
10,000 to 24,999.....		1,225	1,495	2,271	2,805	2,743	2,004	2,362	1,805	1,237	1,662	1,728	
25,000 or more.....		13,551	15,377	16,311	18,483	21,933	23,213	25,583	27,239	27,102	26,610	21,331	

1/ Until 1984, tobacco products, SIC 21, was included with "other manufacturing industries."

2/ Until 1984, data represent companies with less than 1,000 employees.

3/ See footnote #2

(D) Data have been withheld to avoid disclosing operations of individual companies.

(S) Data have been withheld due to imputation of more than 50 percent.

N/A Not available

SOURCE: National Science Foundation/SRS, Research and Development in Industry: 1991

## Appendix 4

## NSF R &amp; D Table Percentages

	Table Value	Percent Share of Year
Group 1 1986:	868	3.07
Group 2 1986:	137	.49
Group 3 1986:	1,229	4.35
Group 4 1986:	796	2.82
Group 5 1986:	2,004	7.09
Group 6 1986:	23,213	82.18
Total -- 1986:	27,891	
Group 1 1987:	963	3.13
Group 2 1987:	115	.37
Group 3 1987:	981	3.19
Group 4 1987:	748	2.43
Group 5 1987:	2,362	7.68
Group 6 1987:	25,583	83.19
Total -- 1987:	30,752	
Group 1 1988:	864	2.69
Group 2 1988:	139	.43
Group 3 1988:	1,157	3.60
Group 4 1988:	914	2.85
Group 5 1988:	1,805	5.62
Group 6 1988:	27,239	84.81
Total -- 1988:	32,117	
Group 1 1989:	987	3.15
Group 2 1989:	105	.34
Group 3 1989:	1,050	3.36
Group 4 1989:	811	2.59
Group 5 1989:	1,237	3.95
Group 6 1989:	27,102	86.61
Total -- 1989:	31,292	
Group 1 1990:	975	3.18
Group 2 1990:	140	.46
Group 3 1990:	959	3.13
Group 4 1990:	280	.91
Group 5 1990:	1,662	5.43
Group 6 1990:	26,610	86.89
Total -- 1990:	30,626	
Group 1 1991:	928	3.67
Group 2 1991:	236	.93
Group 3 1991:	931	3.68
Group 4 1991:	154	.61
Group 5 1991:	1,728	6.83
Group 6 1991:	21,331	84.29
Total -- 1991:	25,308	

## Appendix 4

## NSF R &amp; D Table Percentages

Table SD-6: Federal Funds for industrial R&amp;D Performance

	Table Value	Percent Share of Year
	-----	-----
Group 1 1981:	424	2.59
Group 2 1981:	0	0.00
Group 3 1981:	562	3.43
Group 4 1981:	619	3.78
Group 5 1981:	1,225	7.48
Group 6 1981:	13,551	82.72
	-----	-----
Total -- 1981:	16,382	
	-----	-----
Group 1 1982:	523	2.82
Group 2 1982:	0	0.00
Group 3 1982:	623	3.36
Group 4 1982:	527	2.84
Group 5 1982:	1,495	8.06
Group 6 1982:	15,377	82.92
	-----	-----
Total -- 1982:	18,545	
	-----	-----
Group 1 1983:	641	3.10
Group 2 1983:	0	0.00
Group 3 1983:	740	3.58
Group 4 1983:	718	3.47
Group 5 1983:	2,271	10.98
Group 6 1983:	16,311	78.87
	-----	-----
Total -- 1983	20,680	
	-----	-----
Group 1 1984:	621	2.65
Group 2 1984:	98	.42
Group 3 1984:	902	3.86
Group 4 1984:	487	2.08
Group 5 1984:	2,805	11.99
Group 6 1984:	18,483	79.00
	-----	-----
Total -- 1984:	23,396	
	-----	-----
Group 1 1985:	739	2.72
Group 2 1985:	117	.43
Group 3 1985:	991	3.64
Group 4 1985:	672	2.47
Group 5 1985:	2,743	10.09
Group 6 1985:	21,933	80.65
	-----	-----
Total -- 1985:	27,196	

## Appendix 5

Ten Year Result of Applying Yardstick  
(Private Sector Small Business Share) to Actual  
Federal Research & Development Funds to Industry  
(Dollars in millions)

Year	Percent Small Bus. Share of Priv. Sector R & D	Actual Total Federal Funds to Industry	Total to Small Bus. By Applying Yardstick	Actual Total Funds to Small Bus.	Difference Between Small Bus. Actual & Yardstick
1981	5.31%	\$16,382	\$869.88	\$424	\$445.9
1982	6.01%	\$18,545	\$1,114.55	\$523	\$591.6
1983	8.48%	\$20,680	\$1,753.66	\$641	\$1,112.6
1984	7.36%	\$23,396	\$1,721.94	\$621	\$1,100.9
1985	8.99%	\$27,196	\$2,444.92	\$739	\$1,705.9
1986	10.35%	\$27,891	\$2,886.71	\$868	\$2,018.7
1987	10.10%	\$30,752	\$3,105.95	\$963	\$2,142.9
1988	9.71%	\$32,117	\$3,118.56	\$864	\$2,254.6
1989	9.40%	\$31,292	\$2,941.45	\$987	\$1,954.5
1990	9.81%	\$30,626	\$3,004.41	\$975	\$2,029.4
1991	10.21%	\$25,308	\$2,583.95	\$928	\$1,655.9
		-----	-----	-----	-----
		\$284,185	\$25,545.98	\$8,533	\$17,012.9

-----

Total Actual Federal Industry Funds to Small Business	=	\$8,533	
		-----	X 100 = 3.0%
Total Federal Funds to all Industry	=	\$284,185	

Total Actual Federal Industry Funds to Small Business = \$8,533

Difference between Actual Funds and "Yardstick funds" to Small Business	=	+\$17,012
		-----
		\$25,545

		\$25,545
		-----
		\$284,185
		X 100 = 9.0%



## Appendix 6

Table SD-15. Cost per R&amp;D scientist or engineer, by industry and size of company: 1981-91

Industry and size of company		SIC code	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total.....			\$103,900	\$111,600	\$116,000	\$124,000	\$130,200	\$128,500	\$131,200	\$137,000	\$140,600	\$145,800	\$147,400
Distribution by industry													
Food, kindred, and tobacco products 1/.....		20-21	(O)	(O)	(O)	(O)	(O)	(O)	(S)	(O)	(O)	(O)	141,300
Textiles and apparel.....		22-23	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)
Lumber, wood products, and furniture.....		24-25	(S)	(S)	(S)	115,400	116,300	(S)	(S)	(O)	(S)	(S)	(S)
Paper and allied products.....		26	(O)	70,800	(O)	(O)	(O)	(O)	(O)	(O)	(S)	(S)	108,400
Chemicals and allied products.....		28	96,600	102,500	104,800	112,500	116,300	117,100	127,600	140,400	146,600	156,500	163,700
Industrial chemicals.....		281-82,286	118,000	122,100	123,100	132,000	144,600	150,200	(S)	(S)	(S)	(S)	(S)
Drugs and medicines.....		283	(O)	(O)	103,100	(O)	(O)	113,600	(O)	141,700	(O)	(O)	(O)
Other chemicals.....		284-85,287-89	(O)	(O)	(O)	(O)	(O)	83,100	(O)	101,300	(O)	(O)	(O)
Petroleum refining and extraction.....		13,29	(O)	(O)	(O)	(O)	(O)	(O)	195,600	196,400	201,600	209,900	227,400
Rubber products.....		30	(O)	(O)	75,400	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)
Stone, clay, and glass products.....		32	(O)	(O)	(O)	(O)	(O)	118,000	115,700	(O)	(O)	(O)	(O)
Primary metals.....		33	107,700	118,200	129,900	(O)	(O)	(O)	131,500	117,300	(S)	(O)	(S)
Ferrous metals and products.....		331-32,3398-99	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(S)	(O)	(O)	(O)
Nonferrous metals and products.....		333-36	(O)	(O)	(O)	112,000	136,400	138,800	(O)	(S)	(O)	(O)	(O)
Fabricated metal products.....		34	78,000	(S)	(S)	111,600	112,900	(S)	76,800	82,100	(S)	(S)	(S)
Machinery.....		35	93,900	103,800	108,400	124,500	142,500	(O)	(O)	138,400	134,000	149,000	(O)
Office, computing, and accounting machines.....		357	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)	(O)
Other machinery, except electrical.....		351-56,358-59	(O)	(O)	(O)	(O)	(O)	119,200	104,700	115,500	(O)	(O)	(O)
Electrical equipment.....		36	95,300	100,000	114,300	121,700	124,900	120,700	120,600	118,900	121,600	128,500	122,500
Radio and TV receiving equipment.....		365	(O)	(O)	105,300	(O)	(O)	88,700	111,200	106,900	92,300	164,600	(S)
Communication equipment.....		366	105,500	123,300	135,000	143,000	147,800	141,300	140,500	141,100	140,800	148,700	141,200
Electronic components.....		367	66,700	69,600	(S)	100,500	114,100	(O)	97,400	(S)	(S)	108,800	(S)
Other electrical equipment.....		361-64,369	(O)	(O)	(O)	(O)	(O)	(O)	(S)	78,700	(S)	(S)	(S)
Transportation equipment.....		37	(O)	(O)	(O)	(O)	(O)	170,700	182,400	190,700	195,700	205,000	193,400
Motor vehicles and motor vehicles equipment.....		371	147,400	162,600	184,700	211,400	223,100	(O)	(O)	(O)	(O)	(O)	(O)
Other transportation equipment.....		373-75,379	(O)	(O)	114,200	(O)	(O)	(S)	(S)	(O)	(O)	(O)	(O)
Aircraft and missiles.....		372,376	128,400	148,800	143,600	156,000	161,700	149,800	179,400	185,900	189,400	205,900	185,900

See explanatory information and SOURCE at end of table.

## Appendix 6

Table SD-15. Cost per R&amp;D scientist or engineer, by industry and size of company: 1981-91

Page 2 of 2

Distribution by industry	SIC code	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Professional and scientific instruments.....	38	\$93,400	(S)	(S) \$116,900	\$122,000	(S)	(S)	(S)	(S)	(S)	(S)	(S)
Scientific and mechanical measuring instruments. Optical, surgical, photographic, and other instruments.....	381-82 383-87	(0) (0)	(0) (0)	\$83,200 (0)	(0) (0)	(0) (0)	(0) (0)	(0) (0)	(S) (S)	(S) (S)	(S) (S)	(S) (S)
Other manufacturing industries 1/.....	27,31,39	(0)	(0)	98,500	(0)	(0)	(S)	(0)	(0)	(0)	(0)	(0)
Nonmanufacturing industries.....	10-11,14-17,40- 42,44-51,53-54, 56,60,62-63,72- 73,78,806-07,87	77,200	\$84,800	82,400	84,100	94,600	\$86,800	\$79,100	81,300	(S)	(S)	(S)
Distribution by size of company (Based on number of employees)												
Less than 500 2/.....		58,600	62,800	65,700	55,000	(S)	70,600	74,300	65,800	70,000	(S)	(S)
500 to 999 3/.....		N/A	N/A	N/A	87,200	(S)	103,400	101,400	(S)	97,500	(S)	(S)
1,000 to 4,999.....		77,000	84,800	82,800	96,700	97,300	106,400	100,500	106,800	102,600	110,000	109,200
5,000 to 9,999.....		93,700	82,900	93,400	111,000	119,300	108,400	122,600	123,700	108,800	123,100	143,800
10,000 to 24,999.....		90,900	98,500	112,900	130,500	124,600	122,300	142,300	135,000	127,800	143,600	146,400
25,000 or more.....		117,200	128,900	134,200	143,000	155,300	154,300	163,100	172,200	175,700	177,000	170,900

1/ Until 1984, tobacco products, SIC 21, was included with "other manufacturing industries."

2/ Until 1984, data represent companies with less than 1,000 employees.

3/ See footnote #2

(a) Data have been withheld to avoid disclosing operations of individual companies.

(b) Data have been withheld due to imputation of 50 percent or more.

N/A Not available

NOTE: The number of full-time-equivalent R&D scientists and engineers used to estimate the cost per R&D scientist or engineer is the arithmetic mean of the number of R&D scientists and engineers reported for January in two consecutive years. This number is then divided into the total R&D expenditures of the earlier year, and the ratio is attributed to the earlier year.

SOURCE: National Science Foundation/SRS, Research and Development in Industry: 1991

### The Tech/Cellence Mark



This Mark of Technology Excellence — "Tech/Cellence" as we call it — is legally reserved for uses approved by the Academy of Technology Entrepreneurs and Innovators.

It is first a symbol of achievement — membership in the Academy is by merit-based election. Eligibility begins with having competed successfully in the Federal Small Business Innovation Research program (at least two Phase II's or one Phase III). Other applicant companies and individuals — who have not participated in the SBIR program — will also be welcomed by the Academy's Admissions Committee. Those applicants with technology and entrepreneurial attainments equivalent to the SBIR standard in the judgment of the Academy's Admissions Committee are also eligible for election.

The Tech/Cellence Mark is also a sign of commitment. The Academy and its members are unqualifiedly committed to the proposition that our country can build a national machinery of industrial innovation second to none in the world.

The Tech/Cellence mark is also an explanation of the combination of elements critical to our present and future success in realizing that commitment.

The acorn stands for small, growing, research-based private businesses, the lightning bolt for both technology and innovative creativity.

Each of the six circles stands for a "functional community" whose role in national technology advance is indispensable. They intersect to emphasize their interdependence.

The six circles represent:

1. Universities, colleges and other educational non-profit entities.
2. Large and mid-sized technology-based companies.
3. Small technology-based, entrepreneurial companies — under 500 employees.
4. Private sector financing institutions, particularly commercial banks and venture capital pools.
5. Independent professionals relevant to technology innovation — engineers, architects, doctors, lawyers, accountants, etc.
6. Government agencies at all four levels (Federal, State, County and Municipal whose policies and programs help or hinder technology entrepreneurship).

This symbol, then, clearly expresses an Academy policy view. Success of the American innovation process requires working cooperation among these six groups. The Academy's leaders and members are obviously bound to do their best to achieve it.

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Published October 22, 1993

NUMBER 51

## Loans to small firms lacking

**Only 15 percent of loans going to small businesses**

By CATHERINE REAGOR

The Business Journal

Only 15 percent of all bank loans in Arizona are made to small businesses — yet smaller firms comprise nearly all of the state's business.

According to at least one study, that performance falls way below the national average of about 69 percent of bank loans going to small businesses.

A study by Veribanc Inc. shows Arizona banks have \$2.9 billion in small-business commercial loans of less than \$1 million

Please see Banks, page 44

## IDA boosts small business loans

By CATHY LUEBKE

The Business Journal

Caliber Bank and the Arizona MultiBank have teamed with Maricopa County Industrial Development Authority in a program to loosen up lending for small businesses.

The Capital Access Program is designed to help business owners who previously might not have been able to meet underwriting criteria, says Mike Shields, director of business banking for Caliber.

The unique credit-enhancement program splits risk 50-50 between the banks and the IDA, and it is starting out with a \$3 million lending pool.

"This program is unlike any other in the country," says Shields. In Caliber's case, the IDA deposited \$1 million to secure half of up to \$2 million in loans. Caliber will handle all of the underwriting, documentation and loan servicing. The IDA is not involved in the relationship between the borrower and the bank.

Business owners can borrow up to \$250,000 in renewable or unsecured revolving lines of credit or term loans, at rates and terms established by Caliber Bank. Loans cannot be used for businesses involved with gambling, alcohol, entertainment or public media.

"We plan to use this program to support those loans that may just need a little more effort to be appropriately bankable," Shields says.

Please see IDA, page 45



# Arizona banks trail others in small-business loans

Continued from page 1  
each in their portfolios. They have a total of \$19.8 billion in loans on their books.

The Wakefield, Mass.-based financial research firm reports that about \$339 billion has been funded in commercial loans across the country, and about 69 percent of those—\$313 billion worth—are small-business loans.

Many small-business owners in Arizona have singled the problem out of their lack of credit, but there are the first figures that break out Arizona small-business loans.

The information comes in response to a congressional mandate for banks to break out small-business numbers. Because this is the first reporting of these numbers, federal regulators are concerned with their accuracy.

Citibank statistics show 36 of Arizona's 38 banks are funding small-business loans of \$1 million or less, and a total of 47,515 small-business loans are on their books.

Statistics vary, but 95 to 97 percent of all Arizona companies are considered small businesses.

Most bankers agree there is a big market for small-business lending in Arizona, and several of the larger banks have targeted it. Some of the smaller banks have pocketed profits by making it their main line of business.

Jon Campbell, CEO of Northwest Bank of Arizona, says there is a real need for small-business credit in Arizona. Northwest purchased Citibank Arizona in September and now is one of the state's largest banks, with more than \$2 billion in assets.

He says 85 percent of Northwest's earnings come from small and mid-size businesses and consumers.

"We will not have the focus Citibank had. It was focused on the larger end of the market," says Campbell. "We are aimed at the small and mid-size part of the market."

Steve Roman, senior vice president of corporate relations at Banc One Arizona, says a majority of that bank's loans are below \$1 million and come from the retail side.

He says it's difficult to separate the consumer loans from business loans because a small-business owner may get a consumer loan to fund his or her operation.

Dave Howell, a spokesman for Bank of America Arizona, says that bank identified small-business credit as part of its "strategic plan to address the problem of getting through special small-business

Citibank Bank is in the process of making small and medium-size companies its core business.

Lyle Knight, CEO of the \$1.8 billion-asset Citibank Bank, says its potential loan range is \$100,000 to \$7 million, but it is targeting the lower end of that spectrum.

He says the bank found through extensive strategic planning research that the small and mid-size business market in Arizona was underserved, and that it could find a niche there.

Citibank's a spinoff of the BankAmerica Security Pacific merger, was recently capitalized with \$147 million from institutional and private investors led by The Comorian Group.

Rick Kriebel, chief credit officer for National Bank of Arizona, says about 80 percent of that bank's loan portfolio is made up of small-business credit.

The bank, which has more than \$240 million in assets, targets small-business loans ranging from \$500,000 to \$1 million.

Kriebel says some of the state's big banks have pulled away from small-business lending during the past few years, leaving a gap in service.

First National Bank of Arizona is another of the state's smaller banks to cater to the small-business market. Its president, Stephen Todd, says small-business loans make up a very high percentage of its lending.

Banks decline to give out exact totals on business loans because they consider it proprietary information.

South Dakota banks lead the nation in the

number of small-business loans made, but that could be misleading because small-business credit lines are thrown in with the totals. A substantial number of credit-card companies are operating and processing

national accounts out of South Dakota.

The push to impose small-business credit is on. President Clinton has made it a mandate by working for fewer regulations, reduc-

# Caliber, IDA team to provide small-business loans

Continued from page 1

The Capital Access Program also sets up a \$500,000 junior lien reserve for loans made in conjunction with the MultiBank, a 12-bank consortium. This program will be in the repertoire of credit enhancements, says Andrew Gordon, MultiBank president. It will enable the MultiBank to make loans to small businesses that may have been somewhat thinly collateralized.

For example, he says, the program might open the door to more technology companies with state-of-the-art equipment or proprietary software that is hard to pin down as collateral. MultiBank does not market this or its other programs directly, Gordon says. Businesses should contact their banks, which then can call on MultiBank's resources to give a deal the leverage needed for approval, he says.

Getting the Capital Access Program off the ground was a two-year effort, says Chuck Lotzar, general counsel to the IDA. There was a need to bridge the gap between businesses and lenders, says Doug Young, financial advisor to the IDA. Banks have raised their standard of lend-

ing since the easy-credit days of the 1980s. But that doesn't mean banks don't have money to lend. In fact, a report from the financial reporting firm Veribanc says Arizona banks have some \$9.5 billion available.

The idea for the Capital Access Program originated in 1991 when then-president Joe Jones suggested that the IDA earmark funds to help small businesses in Maricopa County without creating additional bureaucracy or competing with existing bank programs.

"We wanted to create a program that would be as easy as possible for the banks to work with," Lotzar says. Initially, the IDA offered banks a pool of money for loans that would be tied to job creation. But the banks had money and didn't need additional capital that came with strings attached, Young says.

Instead, a credit-enhancement program was suggested that would decrease the risk to banks.

The Maricopa County Board of Supervisors also supported the project, Lotzar says, giving the IDA the latitude needed to make the program happen.

One hurdle was that state law at the time prohibited IDAs from making working-capital loans, Young says. Legislation was passed in 1992 enabling future bond issues to be accomplished with more flexibility and less cost, says Lotzar.

The IDA also wanted to avoid what officials saw as limitations in other credit-enhancement programs. Some programs come with so many restrictions tied to the loan that its value is reduced, Young says.

Also, the IDA didn't want to take on the role of lender and have to monitor the loan process. Sharing the risk 50-50 with banks avoids the added bureaucracy and encourages the banks to maintain a prudent lending policy, he explains.

Those involved with the new program see the 50-50 structure as an innovative approach to the lending dilemma. Ultimately, the IDA would like to get other Arizona banks involved, Young says.

He also expects the Capital Access Program to serve as a model for other communities. "This program is not like anything else in the country," he says. "It will be a model for others in the country and a vehicle

to create jobs and leverage off our success." IDAs traditionally have been associated with industrial development bonds, and the new credit-enhancement program doesn't mean the IDA is out of that business, says Lotzar.

This program is ancillary to the group's bonds, which are generally used by larger, expanding businesses, he says. In fact, it brings the IDA back to its original industrial focus rather than the many housing and health care projects that have been popular subjects for bond financing.

To qualify for the Capital Access Program, borrowers must be for-profit businesses with:

- net worth of \$3 million or less,
  - historical annual net income of less than \$2 million, and
  - fewer than 200 employees.
- Loans may be renewable revolving lines of credit or term loans with a five-year maximum. Fees are 2 percent of the entire loan for the first year, with a 1 percent annual fee on the anniversary date and a \$50 initial review fee. Caliber Bank fees may also be added.

TESTIMONY OF  
CHARLES LUDLAM,  
VICE PRESIDENT FOR GOVERNMENT RELATIONS  
BIOTECHNOLOGY INDUSTRY ORGANIZATION  
TO THE  
SUBCOMMITTEE ON ECONOMIC GROWTH AND CREDIT FORMATION  
OF THE  
COMMITTEE ON BANKING, FINANCE AND URBAN AFFAIRS  
UNITED STATES HOUSE OF REPRESENTATIVES  
ON  
THE AVAILABILITY OF FINANCING FOR  
NEW HIGH-TECHNOLOGY COMPANIES  
OCTOBER 26, 1993

Good afternoon. My name is Chuck Ludlam, and I am the Vice President of Government Relations for the Biotechnology Industry Organization (BIO). I would like to thank the subcommittee for the opportunity to speak at this hearing.

I want to talk to you about capital formation for entrepreneurs and emerging biotechnology companies and make two basic points: 1) the price controls proposed in the draft plan are poisoning our capital markets 2) the price controls imposed by the National Institutes of Health (NIH) as a condition for the transfer of technology are undermining the government investment in biomedical research. I ask that my statement be printed in the hearing record.

The Biotechnology Industry Organization (BIO) represents over 525 biotechnology companies in 47 states. These firms are seeking cures and treatments for deadly and costly diseases like cancer, AIDS, and Alzheimer's, cystic fibrosis, multiple sclerosis and osteoporosis; genetically engineering foods and pesticides; abating pollution; and changing many industrial processes. BIO came into existence on July 1 of this year with the merger of the Industrial Biotechnology Association and the Association of Biotechnology Companies, both associations that had been organized in the early 1980's.



The biotechnology industry is one of the most capital intensive industries in the history of civilian manufacturing. It is certainly the most capital intensive industry of small businesses ever founded. There is no industry for which capital formation is a more pressing issue.

The need for this capital is shown in a Business Week survey of the research conducted by America's businesses. In this survey, the top six firms in the U.S. in terms of research as a percentage of sales were biotechnology companies -- Centocor (124%), Chiron (82.1%), Genentech (54.4%), Genetics Institute (53.6%), Immunex (53%) and Biogen (48.8%). The United States corporate average was 3.7%.

In the same survey, seven of the top ten firms in the U.S. in terms of research expenditures per employee were biotechnology companies -- Biogen (\$178,168 per employee), Genentech (\$115,893), Centocor (\$105,291), Amgen (\$78,072), Chiron (\$76,554), Genetics Institute (\$66,572), and Immunex (\$55,034). The U.S. corporate average was \$7,106. A copy of this survey is attached to my testimony along with a recent Ernst and Young survey of the research intensity of biotechnology firms.

Moreover, the average cost per New Chemical Entity (NCE) is \$359 million according to the Office of Technology Assessment. Biotechnology products are between 7 and 10 times more expensive

than semiconductor chips, the second most R&D intensive product produced.

The research done by biotechnology firms is expensive for one simple reason -- it is at the cutting edge of scientific knowledge. Last week, we had four biotechnology pioneers receive the Nobel Prize -- two for medicine and two for chemistry. Biotechnology firms are focusing on cures and treatments for serious unmet medical needs. The failures and dead ends are many and the costs are extraordinary: clinical trials can cost over \$50 million, a new biotechnology factory may cost \$50 to \$100 million and the FDA clearance process for a drug averages between 7 and 10 years from bench to bedside. In nine out of ten cases, the drug being researched never even reaches the market. A biotechnology company must raise approximately \$400 million before it will be able to sell its first product to a customer.

Capital for the biotechnology industry comes from the private sector almost exclusively. It comes from equity investments in the 235 public biotechnology companies and the 1,000 private biotechnology companies that have not as yet gone public. Small biotechnology companies, as a rule, are not able to borrow money from banks or other lending institutions, which will not lend money to a firm with huge expenses, little or no revenue and a higher risk of failure than success.

My testimony today will focus on private sector capital sources and what government is doing and can do to influence these markets. The government's role is critical and at the moment it could hardly be more negative.

Tax policy is obviously important for capital formation. Prior to my employment with BIO, I served as the Chief Tax Counsel of the Senate Small Business Committee and I drafted Senator Bumpers' targeted capital gains incentive included in President Clinton's budget bill. That incentive will help biotechnology and other high technology firms raise capital in the private markets.

Neither this nor any other tax incentive will be effective, however, if the government poisons the private sector capital markets for biotechnology firms, as it is now doing with the proposed health care reform plan and, to a lesser extent, with the NIH's implementation of CRADAs. There is nothing you can do for the cause of capital formation for the biotechnology industry that will be more helpful than to lift the cloud over our private sector capital markets. We can raise the capital in these markets if the government does not adopt policies that make this impossible. Our principal plea is for the government to get out of the way and let the market operate based on the results of our firm's research.

HEALTHCARE PRICE CONTROLS

Today, we have a crisis in the capital markets for biotechnology companies. (This crisis is documented in BIO's September 1993 Report on the Financial Markets for Biotechnology Companies, a copy of which is attached to my testimony.) The American Stock Exchange Biotechnology Index has dropped approximately 25 percent from November of 1992 through today. Small biotechnology companies are having trouble finding financing because the "window" for public capital market financing has been closed all year. The result of the downturn in the markets is that companies are cutting back their budgets for research and development. They have also cut back their number of employees, or have at least dropped plans to hire new employees. If these conditions persist, the biotechnology industry as we know it today will no longer exist.

There are several causes for the decline in availability of capital for biotechnology companies, including clinical trial failures and profit margins below investor expectations. However, the two causes for this decline over which members of Congress have some control are health care reform and CRADA agreements. I suggest we all focus on what we can control, not on financial market conditions over which none of us has any control.



The principal cause for the downturn in our capital markets is the Clinton Administration's proposal for de facto price controls on "breakthrough" therapeutic drugs -- virtually the only product that our biopharmaceutical companies produce.

Many policymakers believe the Clinton plan does not impose price controls. But, the draft plan -- "working group draft" leaked September 7 -- contains three provisions that have the substance and effect of price controls, if not the name. These are: (1) the review by the National Health Board of the "reasonableness" of the prices of "breakthrough" therapeutic drugs; (2) the authority of the Health and Human Services (HHS) Secretary to negotiate a "special rebate" and to deny reimbursement for (to blacklist) "new" drugs where she cannot negotiate a "special rebate" that yields a "reasonable" price; and (3) a requirement that the government be given a 15% discount on the price of all drugs sold to Medicare patients.

There can be no doubt that the "special rebate" provision is price control in a classic form. It may be disguised as a negotiation over rebates, but the eventual price will be the manufacturer's price minus the rebate. Also, with the "blacklisting" authority as a weapon in reserve, the negotiations will be very one-sided. The "breakthrough drug committee" and the rebate provision also operate as price controls.

I can guarantee you that investors in biotechnology firms view the discussion over the past nine months and during the presidential campaign of drug company pricing with alarm. The three provisions listed above confirm their fears. The provisions are seen by investors as the equivalent of price controls. In the end, what the investors believe is critical to the biotechnology industry. The result is clear: investors have been selling their stock in biotechnology firms and refusing to buy the initial public offerings of biotechnology firms.

Biotechnology companies have enough barriers in raising capital without the health care debate. Of the more than 1,200 biotechnology firms in the United States, 99% have fewer than 500 employees. All small businesses are starved for capital. However, for a biotechnology firm, it is even more difficult. An investor, before he/she invests in a biotechnology company, considers that there must be huge initial investments, that the development period usually lasts between 10 and 12 years and that there is no certainty the investor will even save his/her principal. The investors who do decide to invest in the biotechnology industry make this decision based on the belief that they will receive a return on their investment in proportion to the extraordinary risks that are inherent in the investment.

The specter of price controls now tells these investors that when one of the companies in their portfolio of investments

discovers a "breakthrough" drug, it will be flogged in public if a government bureaucracy thinks the price for it is too high, blacklisted for reimbursement for sales to Medicare patients and required to give the government a 15% discount if reimbursement is allowed for Medicare sales.

Investors cannot fail to notice that the only sector in the entire health care system where managed competition and global budgets are not deemed to be sufficient to restrain costs is that for "breakthrough" or other "new" drugs. No existing drugs are targeted for these special restraints. Only innovation is targeted. It is not hard to interpret what this means to investors in biotechnology companies and the research that they support.

The crunch time is coming for biotechnology companies. Mr. G. Steven Burrill of the accounting firm Ernst & Young, who is an expert in the biotechnology field, says that 58 percent of the biotechnology companies have less than two years of cash on reserve. Biotechnology firms are "burning" their capital at four times the rate they are raising it. With few exceptions they have no revenues from sales to fund their research.

It is not hard to see that this is unsustainable. If the collapse of our capital markets continues, small biotechnology companies will go out of business, or will be forced into selling

off assets and/or making a strategic alliance with a larger firm.

This will be a tragedy for one of the few American industries that is dominant in international markets. This entrepreneurial industry currently employs approximately 97,000 people, but it has the potential to create many more high-skill, high-wage jobs. This industry is the paradigm of the high-tech, high-research, high-risk emerging industry which we all know is the hope for America. We cannot hope to compete based on how low our wages are; we have to compete with our brains.

#### CRADA PRICE CONTROLS

There is a second government policy that is adversely affecting biotechnology companies -- government implementation of the CRADA technology transfer program. The NIH is famous for its extraordinary biotechnology research, basic research that provides us all with fundamental knowledge about human biological processes. NIH basic research programs have helped us understand better how diseases develop in the body and how they are transmitted from person to person and from generation to generation.

The three key ingredients to U.S. dominance in biotechnology -- and biomedical research -- are the presence of government



funding, excellent university research and commercialization into the private sector through the use of risk capital.

NIH is well aware that it must rely principally on private biotechnology companies to translate its basic research into specific, marketable products. The Cooperative Research and Development Agreements (CRADAs) are supposed to facilitate this transfer. This program has the potential to ensure that the billions of dollars the government invests in basic research are translated into products that can change the lives of human beings.

Most of these agreements involve the licensing of NIH patents to private biotechnology firms and the payment of royalties to NIH if and when the patents lead to FDA clearance of products for sale to the public.

BIO finds, however, that the purpose of these agreements -- to commercialize NIH's research -- is undermined by the reluctance in some cases of NIH to grant exclusive patent rights and the inclusion of a "reasonable pricing" clause in the agreements.

If the government is not willing to grant an exclusive license to market a product produced by the company with the agreement, that company has little or no incentive to invest the

millions -- or hundreds of millions -- of dollars necessary to develop the product. Then, if the private company does proceed to develop the product, the government is not satisfied just to receive royalties; the private firm is also subject, in effect, to controls on the price of the product it sells. The government will determine what price is "reasonable," not the market.

The issues of non-exclusive licenses and price controls both have the same effect: to create uncertainty over the value of the investments that must be made in order for the commercialization to be successful.

The requirement for "reasonable prices" may be well-motivated. We all want "reasonable prices" for everything we buy. But, with all due respect to the expertise at NIH, it does not have any expertise relevant to setting prices for therapeutic drugs. For example, nine out of ten research projects at a biotechnology firm typically do not lead to a product that can be sold. This means that firms must seek to cover the costs of that research in the products that are cleared for sale. They must also attempt to achieve a rate of return commensurate with the risk involved for the stockholder so that he/she will not sell the stock and drive the price down. These factors make the pricing of a therapeutic drug very complicated for the firm that creates the product. It is hard to imagine that the government would have any sensitivity or expertise on these issues and it

would probably never see a drug price that was low enough.

Of course, driving down the prices for the therapeutic drugs that do make it to market reduces the royalties that are paid by the firm marketing the product. Worse than this, however, is that if the prices are driven down, fewer firms will be interested in the licenses and investors will not provide the money to translate the licenses into marketable products.

In fact, we have heard of many companies that now refuse to enter into CRADAs because of the "reasonable price" clause. This undermines the value of the government's own multi-billion dollar investment in biomedical research.

The "price control" clause states that when an agreement is reached between the NIH and a private company to develop basic research funded at NIH's expense, there must be an agreement at the time of the agreement on the price that the firm may charge for the drug that all hope will be developed and marketed as a result of the agreement. There is no specificity in the clause about how this calculation will be made or what factors will be considered. The government would apparently have subpoena power to sort through the company's financial records, which companies would view as threatening.

One of BIO's predecessor organizations, the Industrial

Biotechnology Association, has taken the position that the NIH should, instead of attempting to set prices, license its technology in exchange for up front cash payments and/or royalties on sales. This type of arms length negotiation -- with benchmark payments -- is a common practice in the private sector. The precise amounts should be determined by negotiation between the parties, and would vary, based on the stage at which the technology is transferred. Estimates of the additional aggregate revenues to the government from licensing agreements range up to \$1 billion. These funds could be used to support new basic research, and/or to provide a fund for those unable to afford the product that is the result of collaboration between the NIH and a private company.

When one considers price controls -- either in the health care reform bill or with CRADA agreements -- it is instructive to note that Japan also sets drug prices. But, in Japan the government has decided that the way for it to develop a biotechnology industry that can compete with the United States is to set prices for "breakthrough" drugs at a premium which is often three times the U.S. price. I have attached a chart to my testimony that shows the international prices of the principal U.S. biotechnology drugs. It shows that Human Growth Hormone is priced at \$14 in the U.S. and \$53 in Japan; G-CS is priced at \$112 in the U.S. and \$375 in Japan; EPO is priced at \$40 in the U.S. and \$99 in Japan and Alpha Interferon is priced at \$8.75 in



the U.S. and \$25 in Japan. This pricing policy in Japan is rational and self-interested for a country that aspires to challenge U.S. dominance in the international market in biotechnology products. It is ironic that the U.S. government views drug prices as a threat.

In terms of whether the proposal under consideration by the Subcommittee would make sense, or whether it would be feasible for the government to take on equity positions in lieu of royalties, BIO has no position and cannot comment.

In conclusion, the biotechnology industry faces many challenges in raising capital to fund the research for the cures for society's most debilitating diseases. Government can be helpful to the industry in raising capital, as with the enactment of the targeted capital gains incentive, but its most important contribution would be to ensure that it does not poison our private capital markets with the terms of the health care reform plan or its implementation of CRADA agreements.

Thank you again for the opportunity to testify.

**Attachments:**

- Excerpt from Ernst and Young's Annual Industry Report on the biotechnology industry
- Excerpts from Business Week article on R and D expenditures
- Global price comparisons for biotechnology products
- BIO's September 1993 Report on the Financial Markets for Biotechnology Companies

## THE INDUSTRY

## ANNUAL REPORT

# BIOTECH 94

## LONG-TERM VALUE

## SHORT-TERM HURDLES

## INDUSTRY COMPARABLE METRICS

	Sales (\$ in Millions)	Sales per Employee (\$ in Thousands)	R&D Expenditures (\$ in Millions)	R&D Expenditures per Employee (\$ in Thousands)	R&D Expenditures as % of Sales	Net Income (\$ in Millions)	P/E Multiple	Employees	Market Capital (\$ in Millions)
Biotech Industry (Aggregate)	\$7,000	\$72	\$5,700	\$59	81%	(\$3,600)	NM	97,000	\$45,000
Amgen	\$1,051	\$447	\$182	\$77	17%	\$358	14	2,350	\$4,960
Chiron	\$112	\$60	\$143	\$77	128%	(\$103)	NM	1,870	\$2,040
Genzyme	\$180	\$121	\$91	\$61	51%	(\$311)	NM	1,490	\$930
Biogen	\$122	\$349	\$60	\$171	49%	\$38	27	350	\$1,030
Genentech	\$391	\$168	\$379	\$120	71%	\$21	236	2,335	\$4,970
Calgene	\$18	\$64	\$9	\$32	50%	(\$20)	NM	280	\$345
Mycogen	\$31	\$27	\$10	\$9	32%	(\$30)	NM	1,130	\$225
Ecogen	\$3	\$20	\$8	\$53	267%	(\$21)	NM	150	\$135
DNA Plant Technology	\$9	\$64	\$14	\$100	156%	(\$21)	NM	140	\$120
EcoScience	—	—	\$5	\$147	500%	(\$5)	NM	34	\$70
Pharmaceutical Industry*	\$114,000	\$184	\$11,722	\$19	10%	\$16,000	16	618,000	\$261,000
Johnson & Johnson	\$13,753	\$163	\$1,127	\$13	8%	\$1,030	26	84,400	\$27,200
Bristol-Myers Squibb	\$11,156	\$212	\$1,083	\$21	10%	\$1,962	15	52,600	\$29,910
Merck	\$9,663	\$252	\$1,112	\$29	11%	\$2,447	17	36,200	\$40,630
Schering-Plough	\$4,056	\$192	\$522	\$25	13%	\$720	19	21,100	\$13,920
Syntex	\$2,085	\$178	\$374	\$32	18%	\$472	8	11,700	\$4,030
Agri-Chemical**	\$71,614	\$278	\$3,944	\$15	6%	1,710	36	258,016	\$61,725
Du Pont***	\$38,352	\$307	\$1,277	\$10	3%	975	33	125,000	\$31,875
Monsanto	\$7,763	\$230	\$720	\$21	9%	(\$68)	NM	33,800	\$7,080
Cyanamid	\$5,267	\$161	\$566	\$17	11%	\$395	12	32,800	\$4,815
Dow Chemical***	\$18,971	\$309	\$1,289	\$21	27%	\$276	56	61,400	\$15,460
Pioneer Hi-Bred International	\$1,261	\$252	\$92	\$18	7%	\$152	16	5,016	\$2,495

\* Top 15 pharmaceutical companies (aggregate).

\*\* Aggregate amounts derived from the five selected companies listed.

\*\*\* Net income amounts excluding extraordinary items and cumulative effect of accounting changes.

Ernst &amp; Young's Eighth Annual Report on the Biotechnology Industry

# R & D Scoreboard

## IN THE LABS, THE FIGHT TO SPEND LESS, GET MORE

A growing number of companies are succeeding. The keys? Planning and involving manufacturing

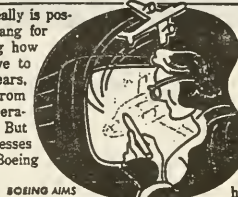
**L**ast December, near the height of his popularity, then-President-elect Bill Clinton chastised IBM after the wounded giant said it would slash \$1 billion—20%—from its 1993 budget for research and development. R&D, said Clinton at his Little Rock economic summit, is "the exact thing we don't want them to be cutting."

The truth is, IBM had little choice, coming off a year when it lost \$4.97 billion. And Big Blue, America's second-biggest R&D spender last year behind General Motors Corp., isn't alone. As the world economy limps along and competition gets tougher, nearly all companies are feeling pressure to hold down R&D costs and at the same time speed the development of products.

On that score, the word from the lab

is encouraging: It really is possible to get more bang for the buck. Assessing how much more will have to wait a couple of years, until more goods from streamlined R&D operations hit the market. But there are early successes around the world. Boeing

Co. is reducing expensive rework by using computers and teamwork to design simultaneously the 777 airliner and the machinery that will build it. Japan's Sharp Corp., by focusing its R&D on a proven winner, has hung on to world leadership in liquid-crystal displays for everything

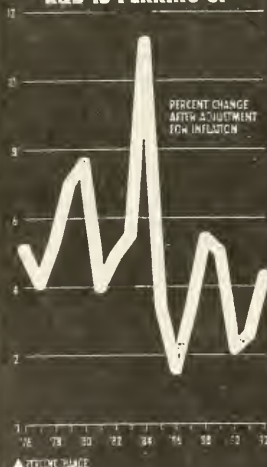


BOEING AIMS TO AVOID COSTLY REWORK ON THE 777 BY SPENDING EXTRA MONEY UP FRONT ON COMPUTER DESIGN

from wall-hanging TV sets to the Wizard electronic organizer. Europe's ABB Asea Brown Boveri (Holdings) Ltd. keeps products flowing swiftly by doing more than 90% of R&D in business units rather than in an isolated central lab.

To prosper, IBM will have to pull off such feats and better. So far, so good, says Mark F. Bregman, vice-president for technical plans and controls: "There are certainly people within IBM who think we're cutting too much. My view is that we're doing generally a very good job of reducing spending without reducing the

### R&D IS PERKING UP



### WHO'S LEADING THE COMEBACK

	Percent change 1992-1991	1992 R&D spending \$ bil. m.	% percent of sales	R&D per employee
CONTAINERS AND PACKAGING	22%	\$144.6	0.22	\$1,347
HEALTH CARE	18	11,204.0	2.7	16,345
AEROSPACE	16	4,514.1	4.4	6,692
MANUFACTURING	3	3,546.7	3.0	3,143
CONSUMER PRODUCTS	8	2,152.4	1.4	2,297
LEISURE-TIME PRODUCTS	0	2,114.0	5.7	3,644
FOOD	0	567.9	0.7	1,332
AUTOMOTIVE	7	12,301.2	4.0	2,103
ELECTRICAL AND ELECTRONICS	7	7,961.7	6.0	6,126
OFFICE EQUIPMENT AND SERVICES	5	17,196.2	5.4	14,720
CHEMICALS	4	5,554.5	4.1	10,461
SERVICE INDUSTRIES	5	135.4	0.7	916
CONGLOMERATES	3	3,434.5	2.6	4,747
HOUSING	2	411.4	1.3	2,754
PAPER AND FOREST PRODUCTS	0	444.7	1.1	1,271
TELECOMMUNICATIONS	-3	3,649.4	3.1	5,673
FUEL	-5	2,751.7	0.8	4,120
METALS & MINING	-6	410.2	1.1	2,004
ALL-INDUSTRY COMPOSITE 1992	7	79,435.6	3.7	7,116
ALL-INDUSTRY COMPOSITE 1991	7	74,212.6	3.6	6,355

SOURCE: COMPTON, ELECTRONICS, MANUFACTURING



## R&amp;D'S BIGGEST SPENDERS

## BY TOTAL SPENDING...

1992 R&D expenses  
in millions

1 GENERAL MOTORS	\$5,917
2 IBM	5,083
3 FORD MOTOR	4,332
4 AT&T	2,911
5 BOEING	1,846
6 DIGITAL EQUIPMENT	1,754
7 HEWLETT-PACKARD	1,421
8 EASTMAN KODAK	1,517
9 GENERAL ELECTRIC	1,253
10 MOTOROLA	1,335

## ...BY SPENDING PER EMPLOYEE...

1992 R&D expenses  
per employee

1 BIOGEN	\$178,168
2 GENENTECH	115,893
3 CENTOCOR	105,291
4 CHIPS & TECHNOLOGIES	86,137
5 AMGEN	73,072
6 CHIRON	70,554
7 GENETICS INSTITUTE	66,572
8 TRIGENT MICROSYSTEMS	52,968
9 ADOBE SYSTEMS	53,927
10 IMMUNEX	55,034

SOURCE: COMPUSTAT PLUS/COMPUTAT SERVICES

## ...AND IN RELATION TO SALES

1992 R&D expenses  
as percent of sales

1 CENTOCOR	124.3%
2 CHIRON	82.1
3 GENENTECH	54.4
4 GENETICS INSTITUTE	53.6
5 IMMUNEX	53.0
6 BIOGEN	49.8
7 CONTINUUM	33.9
8 CHIPS & TECHNOLOGIES	32.4
9 TEKLEK	27.9
10 INTEGRATED DEVICE TECHNOLOGY	25.7

impact of the spending." As more companies master that trick, efficiency won't be an emergency measure anymore—it'll be a strategic necessity.

The successes so far come against a backdrop of frustration. The efficiency movement that hit factory floors in the '80s and the office in the '90s took a long time to reach the lab. CEOs were reluctant to tamper with a system that many didn't understand. So labs often chased stray ideas or invented products that were unbuildable or unsalable. Finally, top managements put on the squeeze, and real growth in R&D spending in the 1990s has trailed the average for the '70s and '80s.

**STREAMLINING.** Still, forward-thinking companies began finding a way out of the box. Motorola Inc. and Hewlett-Packard Co., for instance, developed principles for streamlining R&D that are being inculcated, albeit slowly, in other companies. "Measuring and improving R&D productivity and effectiveness" was the goal most often cited by 248 R&D directors in an April survey by the Washington-based Industrial Research Institute.

Indeed, few business issues are more important. Getting products to market quickly is becoming the key to success, especially since leading companies have reached rough parity in other aspects of business, such as manufacturing costs. Productivity in U.S. manufacturing rose a healthy 2.9% annually in the 1980s. Now Michael E. McGrath, co-founder of Weston (Mass.) product development consultant Pittiglio Rabin Todd & McGrath, predicts that "in the '90s, you'll see the same kind of productivity improvements in R&D that you saw in manufacturing in the '70s and '80s."

By contrast with manufacturing, however, the efficiency drive in R&D isn't occurring in a crisis atmosphere. So though increases in R&D spending are still modest by earlier standards, they're respectable except at the most embattled companies.

In the U.S., R&D outlays by some 900 big companies rose 7% in 1992, to \$79.4 billion, according to Standard & Poor's Compustat Services. R&D spending was strong in a range of U.S. businesses last year. It rose 18% in health care, led by biotech, and 16% in aerospace, paced by a 30% leap at Boeing related to the 777.

Spending fell 3% in telecommunications, largely because of a 7% falloff at AT&T that was partly due to completing the integration of NCR Corp. The all-industries increase was 4.3% after inflation, the biggest in three years.

Internationally, spending gains were just as healthy. R&D outlays by 200 big companies outside the U.S. rose 7.8% in their latest fiscal years before adjustment for inflation, according to S&P Compustat's Global Vantage unit. International spending changes are measured in local currencies so percentages aren't skewed by the dollar's fall. Siemens repeated as the No. 1 R&D spender outside the U.S. on the strength of its \$5.52 billion in outlays,

while Japanese companies took 6 of the top 10 positions. Sweden, with 10 companies surveyed, had the biggest national gain in R&D spending, at 15.2%. Odd as

it sounds, such numbers don't reduce the pressure to economize, because the demand for R&D is rising even faster than budgets, executives say.

Multinational companies, which have the most room to improve, have been the first to take efficiency to heart. Many have labs dotted across several continents, so lines of authority can be fuzzy and cooperation may be inhibited by language or cultural barriers. ABB has citizens of 20 countries in its Zurich lab. The solution, R&D directors say, is improved communication. And that's

where many are focusing their efforts. **CULTURE SHOCK.** ABB is a good example. The Swedish-Swiss power and transportation conglomerate wasn't sure how to digest its 1990 acquisition of Combustion Engineering Inc., based in Stamford, Conn. But it benefited from some transatlantic swaps. It hired an American, General Electric Co. veteran Craig S. Tedmon Jr., to head the company's Zurich-based worldwide R&D. And it installed an Austrian who holds a U.S. PhD, Gernot H. Gessinger, to run GE's Windsor (Conn.) combustion lab.

Cross-culturalism in research can be a shock. Gessinger found the Connecticut lab dirty, stuffed with unneeded equipment, and unfocused. He ordered a cleanup and canceled dangling projects. And he uncovered distrust. The pragmatic engineers in Connecticut feared intrusions by ABB's combustion theoreticians in Baden, Switzerland. The Swiss doubted the Yanks' credentials. Gessinger built trust by having Windsor help perfect a gas-fired boiler that Baden developed. Since then, he has beefed up Windsor's research staff with a combustion expert from Massachusetts Insti-



ABB'S RESEARCH CHIEF ARGUES THAT BEING AT THE FOREFRONT OF R&D IS CHEAPER IN THE LONG RUN THAN COPYING OTHERS



SHARP IS ZEROING IN ON A FIELD WHERE IT'S ALREADY A WORLD LEADER—LIQUID-CRYSTAL DISPLAYS FOR COMPUTERS AND TVs

# R&D SCOREBOARD

## GLOSSARY

**CRITERIA:** Data are for the most recent fiscal year reported as of May 18. If the company is not on a calendar-year basis, the number of the month in which its fiscal year ends appears in parentheses following the company name. Companies included in the survey are limited to those reporting sales of \$58 million or more and R&D expenses of at least \$1 million.

N/A=not available; NM=not meaningful; NEG=negative earnings; NR=not ranked; \*includes customer or government sponsored R&D; \*\*includes engineering expense. †R&D includes GM Hughes Electronics and EDS DATA STANDARD & POC'S COMPUTAT SERVICES, A DIVISION OF MCGRAW-HILL INC.

**R&D EXPENSES:** Dollars spent on company-sponsored research and development for the most recent fiscal year, as reported to the Securities & Exchange Commission on Form 10-K. Excludes R&D under contract to others, such as U.S. government agencies.

**R&D DOLLARS PER EMPLOYEE:** R&D expenditures divided by the reported number of company employees.

**PROFITS:** Pretax income.

COMPANY	STOCK SYMBOL	R&D EXPENSES					SALES			PROFITS		
		CHANGE FROM 1992 \$ MIL.	PER EMPLOYEE		CHANGE FROM 1992 \$ MIL.	R&D AS % OF SALES	CHANGE FROM 1992 \$ MIL.	PER EMPLOYEE OF SALES	R&D AS % OF PROFITS	CHANGE FROM 1992 \$ MIL.	R&D AS % OF PROFITS	R&D AS % OF PROFITS
			1991	1992								
			%	\$								

## TO HEALTH CARE

INDUSTRY COMPOSITE 11804.0 18 16384.7 15220.3 122187.5 12 169.5 9.7 22728.4 12 51.9

### (A) DRUGS & RESEARCH

GROUP COMPOSITE 8612.2 18 22121.3 24407.2 74628.8 11 191.4 11.5 15760.4 11 54.6

A. L. Laboratories	BHD	14.3	17	7500.0	32	5612.9	31	295.1	15	155.3	4.8	17.6	89.5	81.1
Allergan	AGN	90.8	22	17603.7	19	12680.9	20	897.7	7	174.0	10.1	144.0	NM	43.1
ALZA	AZLA	18.3	58	17086.8	21	21140.0	13	229.3	54	214.1	8.0	105.5	NM	17.4
American Home Products	AHP	552.5	28	10906.6	27	8026.6	30	7873.7	11	155.4	7.0	172.1	-2	32.0
Amgen	AMGN	182.3	51	78071.5	4	59134.3	6	1093.0	60	468.1	16.7	563.1	257	32.4
Bayer Laboratories (6)	BIL	7.4	26	19829.3	18	11247.9	23	100.8	7	268.8	7.4	-3.5	NM	NEG
Bioceut Laboratories (3)	BCL	8.8	45	10275.9	26	9374.9	28	92.3	11	127.2	9.5	-11.2	NM	NEG
Biogen	BGEN	60.6	36	178168.0	1	117840.3	1	123.7	101	365.0	48.8	39.9	436	151.3
Bristol-Myers Squibb	BMY	1083.0	10	20589.4	16	16316.8	17	11156.0	8	212.1	9.7	1967.0	-29	54.5
Carter-Wallace (3)	CAR	52.0	6	12459.2	25	10519.9	25	673.4	6	161.5	7.7	67.3	-12	77.2
Celanese	COT	94.8	41	105291.0	3	105291.0	2	76.2	43	84.7	12.3	-194.1	NM	NEG
Chiron	CHIR	142.9	79	76554.3	5	77953.0	4	174.0	75	93.2	82.1	-92.4	NM	NEG
Diagnostic Products	DP	12.8	-5	15383.2	23	14642.2	19	103.5	15	123.9	12.4	23.7	2	34.2
E-Z-EM (5)	EZEM	7.0	-1	6859.8	33	5503.9	32	88.3	18	86.7	7.9	5.4	NM	129.4
Farnam Laboratories (3)	FEX	17.8	35	15574.9	22	11317.6	22	240.4	36	210.7	7.4	77.5	41	22.9
Genentech	GEN	270.1	27	115893.1	2	87879.7	3	496.2	8	212.9	54.4	21.9	-53	123.16
Genetics Institute (11)	GENZ	47.0	3	66572.1	6	71433.4	5	87.7	6	124.3	53.6	-37.0	NM	NEG
Genzyme	GENZ	15.7	48	10563.3	29	11510.9	21	219.1	80	147.4	7.2	-13.2	NM	NEG
ICM Pharmaceuticals	ICM	10.7	63	1762.8	35	2969.6	34	351.8	20	90.8	1.9	-60.3	NM	NEG
Immune	IMMX	32.7	63	55033.6	7	31506.0	8	61.8	17	103.8	53.0	-77.6	NM	NEG
IVAX	IVX	19.5	63	9257.8	30	8642.0	29	451.0	102	213.8	4.3	54.2	222	34.0
Life Technologies	ITEK	13.9	7	10572.3	28	9529.0	27	197.6	15	150.4	7.0	24.4	27	57.0
Lilly (BB)	LY	924.9	21	28723.6	12	23769.5	11	6167.3	8	191.5	15.0	1182.3	-37	78.2
Marian Merrell Dow	MRC	465.0	18	47410.3	8	40568.0	7	3320.0	16	338.5	14.0	1017.0	14	43.7
Maxwell Laboratories (7)	MXWL	5.9	34	8492.9	31	5144.6	33	90.2	4	128.8	6.6	-6.7	NM	NEG
Medco Containment Services (6)	MCCS	1.6	18	230.2	38	349.4	38	1813.2	35	268.6	0.1	170.6	78	0.9
Merck	MRK	1111.6	13	28947.9	11	24202.0	10	9662.5	12	351.6	11.5	3593.8	13	30.9
Mylan Laboratories (3)	MYL	13.5	72	NA	39	NA	39	212.0	61	NA	6.4	97.3	94	13.9
Parke (6)	PRGO	3.4	116	1063.7	27	920.8	37	409.8	46	129.2	0.8	45.1	133	7.5
Pfizer	PFE	863.2	14	21208.8	15	15520.2	18	7230.2	4	177.6	11.9	1534.8	63	56.2
Parke (6)	PURE	5.8	34	20010.3	17	17547.1	15	64.5	23	221.8	9.0	17.7	111	32.9
Rhone-Poulenc Research	RPR	521.3	17	22764.2	14	16793.5	16	4093.9	7	178.9	12.7	583.7	20	89.3
Schering (IL, P) (3)	SBR	8.5	15	3401.6	34	2576.8	35	337.8	13	135.9	2.5	29.3	61	28.9
Schering-Plough	SGP	521.5	22	24715.6	13	18739.3	14	4055.7	12	192.2	12.9	953.9	11	54.7
SPI Pharmaceuticals	SPI	7.8	60	1429.9	36	958.2	36	476.1	31	86.9	1.6	53.2	1	14.7
Synex (7)	SYN	374.4	19	22000.0	9	26892.6	9	2083.0	15	178.2	18.0	542.9	14	69.0
Upjohn	UPI	548.5	12	29023.6	10	23163.5	12	3648.9	7	194.1	8.0	700.2	-2	78.3
Warner-Lambert	WLA	473.5	12	13926.5	34	10958.2	24	5597.6	11	164.6	15.5	858.2	87	35.2
Zenith Laboratories	ZENL	71	40	17289.5	20	10206.6	26	59.4	3	144.6	12.0	-1.4	NM	NEG



## R & D Scoreboard

tute of Technology. "We work now in a new climate," Gessinger says.

Finding research and development also depends on puncturing the myth that it's inherently unmanageable. In fact, reorganizing R&D can cut product-development cycles by up to one-half, according to Pittiglio Rabin, a practitioner in the field. One of its ideas: identify weak projects earlier, kill them, and nourish the survivors. Planning helps, too. At Ford Motor Co., the third-biggest U.S. spender on R&D, Neil W. Ressler, executive director of North American vehicle engineering, says: "A dollar spent up front [on planning] might save \$10 or \$100 downstream."

**INVISIBLE SHIELD.** DuPont Co. started getting product development on track by mimicking Motorola. With the help of Pittiglio Rabin, DuPont copied Motorola's style of concurrent engineering: involving manufacturing and marketing people with scientists from the very start of product development. DuPont's marketers brought radiologists into the labs to evaluate a chest X-ray system while there was still plenty of time to change it. The system, UltraVision, was developed in 16 months, half the usual time, and is in about 150 hospitals. Says Suzanne R. Linderman, business director for diagnostic imaging: "It's the most successful market introduction we've ever had in the business."

Decentralization is another current watchword. Often, there is an invisible but nearly uncrossable barrier between a central lab and operating businesses. Intel Corp. Chairman Gordon E. Moore discovered that when he co-founded the company that became Fairchild Semiconductor Corp., the granddaddy of Silicon Valley. "As the company grew, it became increasingly difficult to get ideas out of the lab and into the divisions," Moore says. In fact, startup companies used Fairchild's ideas before Fairchild itself did, he says. So Intel, which hiked R&D 26% last year, doesn't have any central lab at all. It does all of its research through operating divisions.

Intel is hardly the only company to decentralize. AT&T Bell Laboratories, once a monolith, is now mainly a name on a badge for most people associated with it. Most take orders from AT&T's

business units. That change of authority was confirmed on Jan. 1, when two-thirds of the 21,000 people who got paychecks from Bell Labs began drawing them from AT&T's operating businesses. Decentralization paid off in the forthcoming Eco, a combination computer, phone, and sketch pad that grew out of unusually candid discussions among

AT&T's researchers, product planners, and corporate partners. Such streamlining also helped AT&T absorb last year's 7% cut in R&D spending.

That doesn't mean Bell Labs has become some kind of job shop, of course. While there's more emphasis on here-and-now products, AT&T devotes 10% of its R&D to basic research, the same as before. And there's still room for free spirits. John H. Davis, Bell Labs' group technical officer for communications services, says he winks when he sees unauthorized work going on if it seems worthwhile to him: "My role is not to stomp on things that need to survive."

Frank P. Carrubba decentralized Philips Electronics' R&D in much the same way when he was hired from Hewlett-Packard in 1991. Philips' R&D used to be 100% funded by headquarters. That kept the labs insulated from business needs during a crisis of falling profits and aging products. So Executive Vice-President Carrubba slashed the RQ share to 30%, forcing researchers to seek work from operating divisions. Carrubba farmed out peripheral research to universities in Europe and the U.S. And he formed a group to field all ideas for new products—so lower-level managers don't

allow something terrific to die on the vine," as had often happened.

IBM's once-cloistered researchers are being forced to learn entrepreneurship in a hurry. Three years ago, they created a supercomputer for generating colorful 3-D images from gigabytes of data. Rather than hand it off to a business unit, where it might get lost, IBM Research formed an internal startup to develop and sell it. In Zurich, IBM's lab even manufactures, using a test line to make specialty lasers for sale to the telecommunications industry.

It's possible, of course, that too much focus on short-term problems and cost savings could leave companies starving for new ideas a few years hence. Retirement incentives have stolen brainpower from many U.S. labs, says Charles F. Larson, executive director of the Industrial Research Institute. Overseas labs are facing many of the same issues. Hitachi Ltd. has roughly halved capital-equipment spending by its vaunted Advanced Research Laboratory since 1989 to save money. After enduring such cuts, says Shojiro Asai, the lab's general manager, "we may not be able to embark on some grand new enterprise."

Still, don't assume that giving business types more say in research must produce short-term thinking. Once trust develops between the two, managers may actually end up urging researchers to concentrate on longer-term needs, says William F. Powers, executive director of Ford Research Laboratory. Agrees ABB's Tedmon: "Business managers many times have as long-range views as anybody in the laboratories."

**BLOCKBUSTERS.** In the fastest-growing companies, the distinction between the business and the lab can be hard to detect. That's true in biotechnology. At Chiron Corp., R&D was 82% of sales last year. The bet, of course, is that heavy spending now will produce a stream of blockbuster drugs that will have Chiron sitting pretty for years.

Companies such as Chiron aren't increasing R&D on a whim, and neither are their counterparts in less flashy industries. Companies that want to grow must sow new seed. But they're husbanding resources more carefully than ever. To paraphrase the President, that is the exact thing they should be doing.

*By Peter Coy in New York, with Jonathan N. Levine in Paris, Joseph Weber in Philadelphia, Richard Brandt in San Francisco, Neil Gross in Tokyo, and bureau reports*



CHIRON, LIKE OTHER BIOTECH COMPANIES, LIVES AND DIES BY R&D. IN 1992, R&D EQUATED 82% OF SALES

### THE U.S. LAGS IN CORPORATE R&D GROWTH

Top R&D spenders among 100 nations	Percent change 1982 vs. 1991	1992 spending (billions)	% percent of sales	No. firms
SWEDEN	13.2%	\$2,500	5.3%	242/77
BRITAIN	9.9	9,098	2.7	33.5
SWITZERLAND	7.5	5,208	5.3	29.6
JAPAN	5.5	35,735	4.5	109.2
FRANCE	4.2	9,173	3.8	60.4
GERMANY	7.5	14,402	5.4	146.3
ITALY	5.4	3,781	4.2	55.5
CANADA	7.5	2,474	5.2	74.3
THE NETHERLANDS	7.6	3,104	5.2	167.7
FOREIGN COMPOSITE	7.5	87,751	4.5	11.4
U.S. COMPOSITE	7.1	79,437	3.7	57.4

U.S. SOURCE: J. P. MORGAN & CO. FOREIGN SOURCE: EUROSTAT

# GLOBAL PRICE COMPARISON OF BIOTECHNOLOGY THERAPEUTICS

Biotechnology Therapeutics	United States	Average European	Canada	Japan	% Difference US/Europe	% Difference US/Canada	% Difference US/Japan
Human Growth Hormone (Genentech) (1 International Unit)	\$14.00	\$22.00	\$27.00	\$53.00	-36%	-48%	-74%
G-CSF (Amgen) (300 mg vial)	\$112.00	\$122.00	\$122.00	\$378.00	-8%	-8%	-70%
EPO (Amgen) (4,000 unit vial)	\$40.00	\$57.00	\$43.00	\$99.00	-30%	-7%	-60%
Ceredase (Genzyme) (per unit)	\$3.50	\$3.50	\$3.50	\$3.50	0%	0%	0%
Alpha Interferon (Hoffmann-LaRoche) (MM units)	\$8.75	\$8.00	\$8.75	\$25.00	9%	0%	-65%

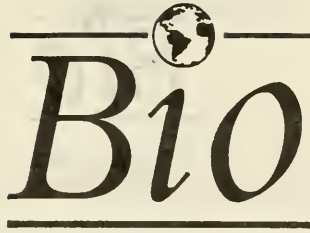
These five drugs represent over 75% of 1992 biotechnology therapeutic drug sales in the United States.

Note: Prices are at manufacturer, or wholesale level, but are consistent for each product.

The "mark-up" to consumers varies widely and the manufacturer has no control over the final price.

Source: Robertson Stephens & Co.





**SEPTEMBER 1993  
REPORT ON THE FINANCIAL MARKETS  
FOR BIOTECHNOLOGY COMPANIES**

**"If the Administration imposes price controls on our products, no amount of good intentions will help this fledgling industry."**

**Mr. David Robinson, CEO, Ligand Pharmaceutical**

**"... any significant government-mandated price controls will injure the pharmaceutical industry, but destroy the biotech industry."**

**Dr. George Rathmann, CEO, ICOS Corporation**



BIOTECHNOLOGY  
INDUSTRY  
ORGANIZATION

## Executive Summary

### BOARD OF DIRECTORS

#### EXECUTIVE COMMITTEE

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VICE CHAIRMAN,  
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AND ENVIRONMENT  
Roger H. Salquist  
Calgene, Inc.

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ImmunoGen, Inc.

OFFICERS AT LARGE  
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AVID Therapeutics Inc.

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EDITEK, Inc.

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Robert J. Beckman  
Intergen Company

This Report is presented by the Biotechnology Industry Organization (BIO), which represents the emerging biotechnology industry in the United States and abroad.

The Report contains data, presented in the form of graphs, documenting the collapse of the capital market for biotechnology companies. It includes articles, as well as press and market analyst quotations, which point to the discussion of price controls or review as a major factor in the collapse of the capital market.

The data indicates that the capital market for biotechnology companies collapsed in January of 1993 and has not recovered. There are several explanations that can be given for the collapse, including poor trial results for therapeutic drugs that were considered industry leaders, and profits below analysts predictions for companies considered to be industry pacesetters. However, the Administration's discussion of price controls or "jawboning" is clearly a major factor in the collapse of the market and it is the one factor which the President and the Congress can influence.

Biotechnology firms are among the most capital and research intensive enterprises in the country, and the growth of the industry is dependant upon the equity markets for capital to continue financing research and development. Debt capital is not generally available to biotechnology firms.

As a result of the collapse of the capital market, the biotechnology industry is being forced to slash research and development spending inevitably delaying or terminating the development of treatments for such diseases as Alzheimer's, AIDS, and various cancers. Companies are increasingly turning to Japan and Europe for capital, potentially relinquishing the United States technological advantage in the field of biotechnology.

This Report concludes that if the President and the Congress proceed to impose price controls or "jawboning", the United States biotechnology industry will be crippled with drastic consequences for American competition, employment and human health.

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WASHINGTON, D.C. 20006-1604

202-457-2124

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### I. Graphs

- The BIO Index lost 18.64% from November 1992 through July 1993.
- The value of initial public offerings through June 30, 1993 is only \$253 million, compared with \$1,203 million for all of 1992 and \$1,542 million for all of 1991.
- The value of the total offerings through June 30, 1993 is only \$759 million, compared with \$3,256 million for all of 1992 and \$4,200 million for all of 1991.

### II. Articles

"Investors fear that biotech companies will have difficulty recouping profits from their enormous investment. Indeed, the 40% drop in biotech stocks since the Clinton Administration took office in January reflects that fear."

Chris Kranl, "Backing Out of Biotech," *Los Angeles Times*, June 7, 1993, p.D1.

### III. Press and Analyst Quotations

"The downturn (in the capital market for biotechnology companies) has been exacerbated by fears that the Clinton Administration's forthcoming healthcare-reform plan will place strict controls on the price of prescription drugs, severely limiting the profitability of biotech firms."

R.L., *In Vivo: the Business & Medicine Report*, March, 1993, p.4.

"Biotech stocks continue to be weak due in part to the overall fear of Clinton healthcare policies and their possible impact on the ability to raise capital and on V.P. Gore's fence-straddling biotech policy which professes to be supportive in distinguishing biotech from pharmaceutical products but calls for more regulation."

"Merrill Lynch Global Securities Research - Biotechnology - Reasons to Buy Genzyme and Protein Design Now," June 24, 1993, p.2.

## I. Graphs

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- The Fidelity Biotech Select Fund lost 18.15% from April 1992 through April 1993.

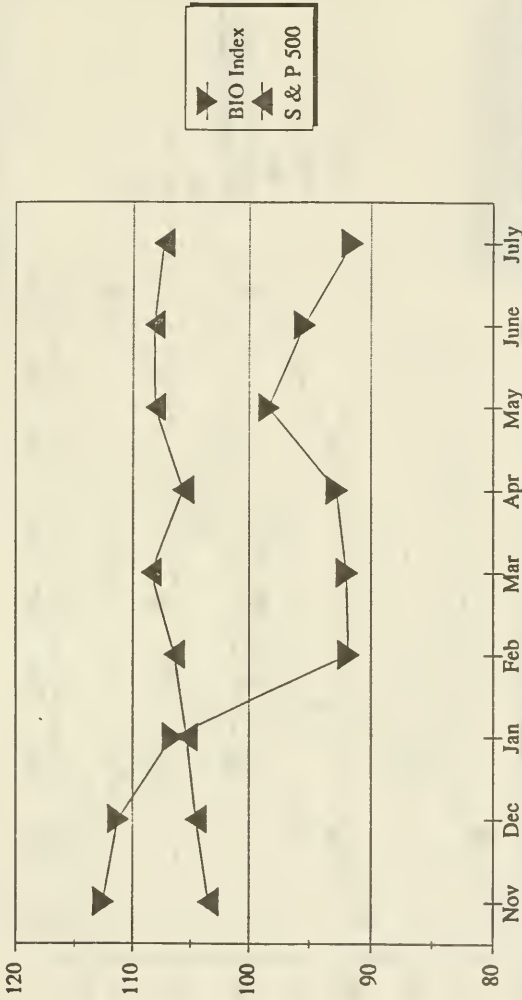
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<sup>1</sup> The BIO Index consists of 100 public biopharmaceutical companies: Tier 1 companies with a market capitalization of greater than \$400 million; Tier 2 companies with a market capitalization of between \$100-\$400 million; and Tier 3 companies with a market capitalization of less than \$100 million. The BIO Index is weighted in favor of Tier 2 and 3 companies to accurately represent the biotechnology industry. The Amex Index, found elsewhere in this Report, is weighted in favor of large capitalization, Tier 1 companies. The large drop in the Amex Index is attributable to disappointing clinical results for several of its companies.



# BIO Index vs. S&P 500

## 11/92 through 7/93

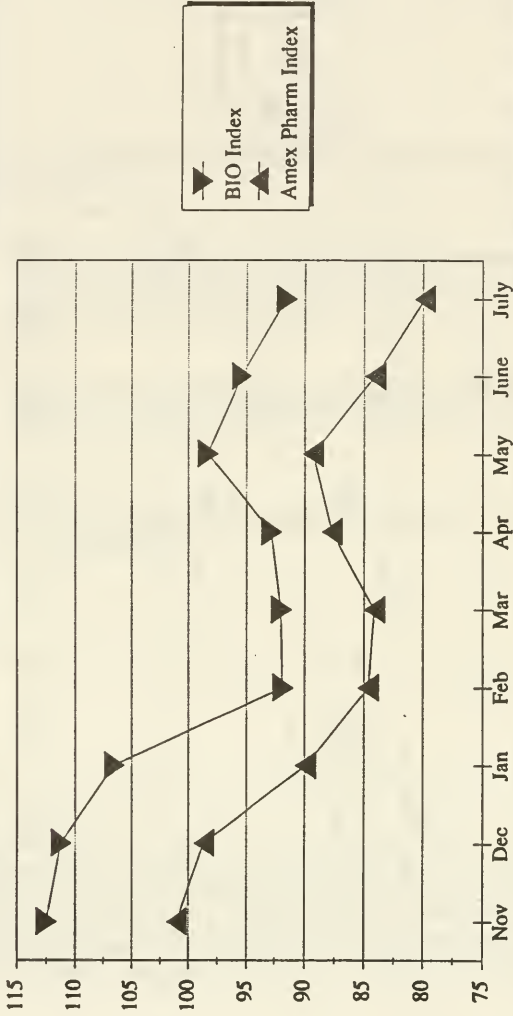


\* For purposes of comparison, we have set the S&P 500 and the BIO Index equal to 100, starting from October 1992.

S&P 500 % Increase for  
Nov through July: 4%  
BIO Index % Decrease for  
Nov through Dec: 18.64%

# BIO Index vs. Amex Pharm Index

## 11/92 through 7/93

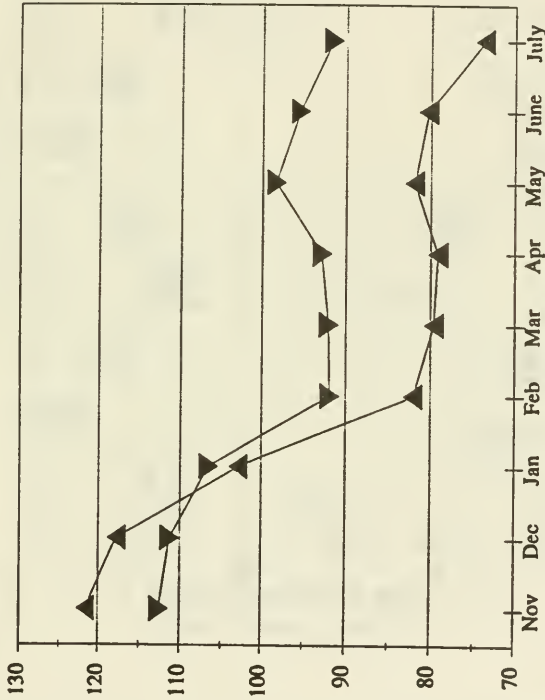


Amex Pharm Index % Decrease  
for Nov through July: 20.98 %  
BIO Index % Decrease for Nov  
through July: 18.64 %

\* For purposes of comparison, we have set the Amex Pharm Index  
and the BIO Index equal to 100, starting from October, 1992.

# BIO Index vs. Amex Biotech Index

## 11/92 through 7/93

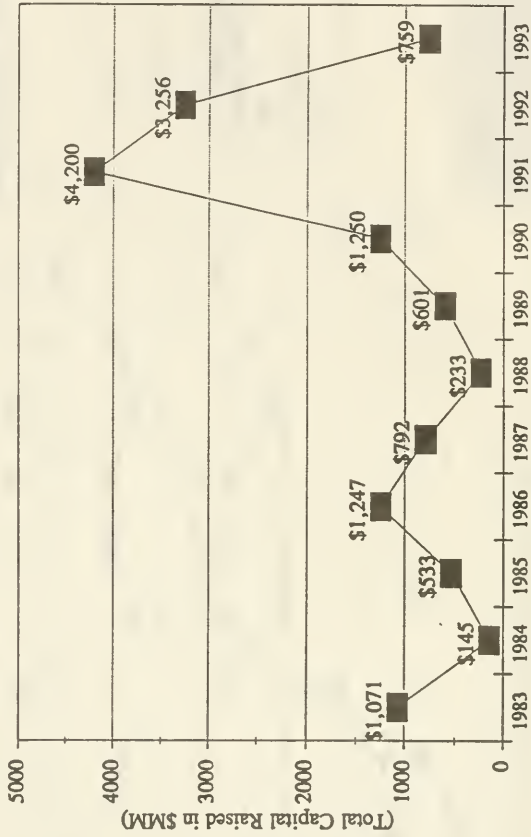


\* For purposes of comparison, we have set the Amex Biotech Index and the BIO Index equal to 100, starting from October 1993.

Amex Biotech Index % Decrease for Nov through July: 39.39%  
BIO Index % Decrease for Nov through July: 18.64%

# Biotechnology Total Offerings

1/1/83 - 6/30/93



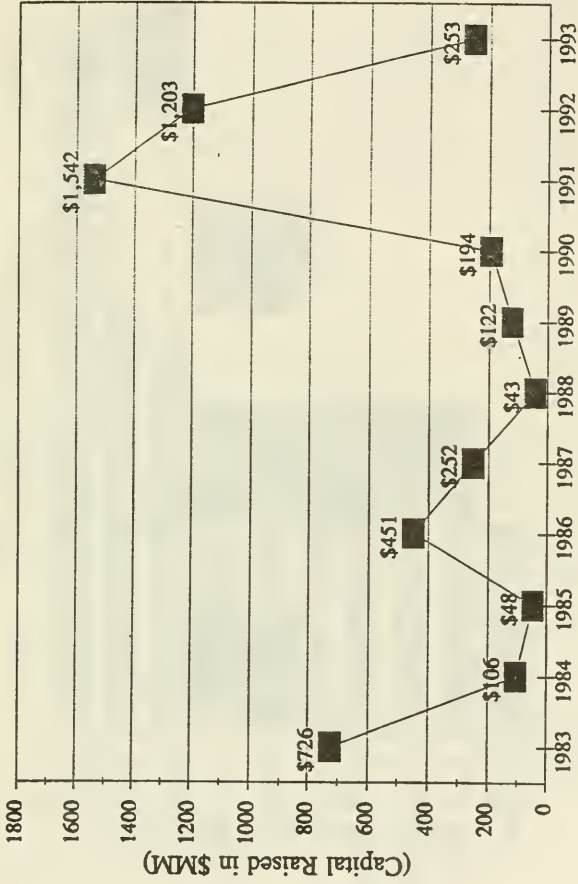
Source: Robertson Stephens & Co.

Source: Securities Data Company



# Biotechnology Initial Public Offerings

1/1/83 to 6/30/93

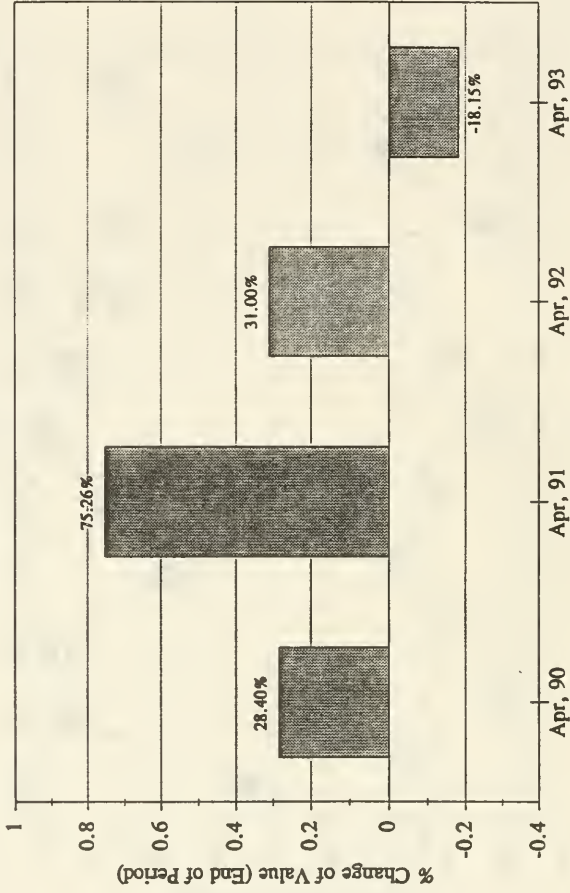


Source: Robertson Stevens & Co.

Source: Securities Data Company

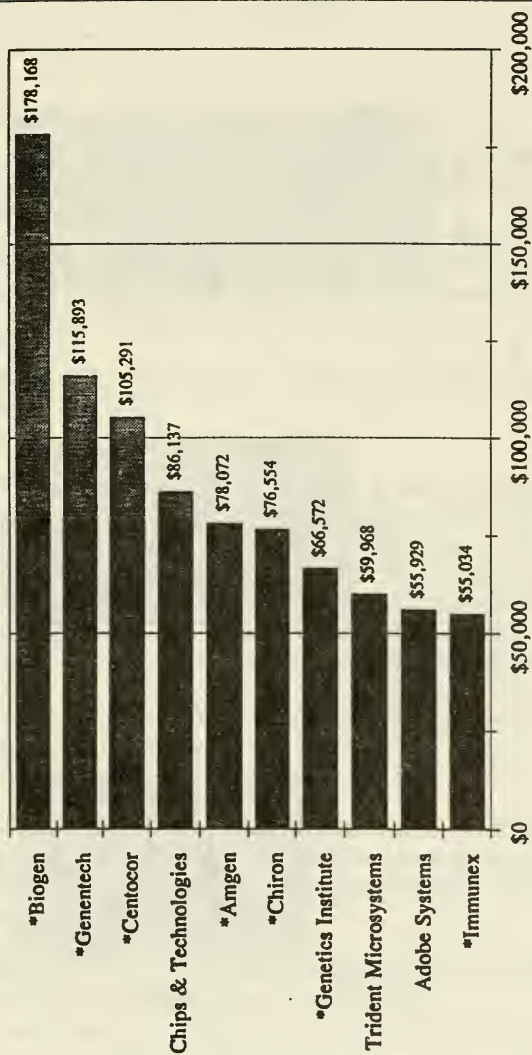
## Fidelity Biotech Select Fund

4/89 through 4/93



Source: Fidelity Investments

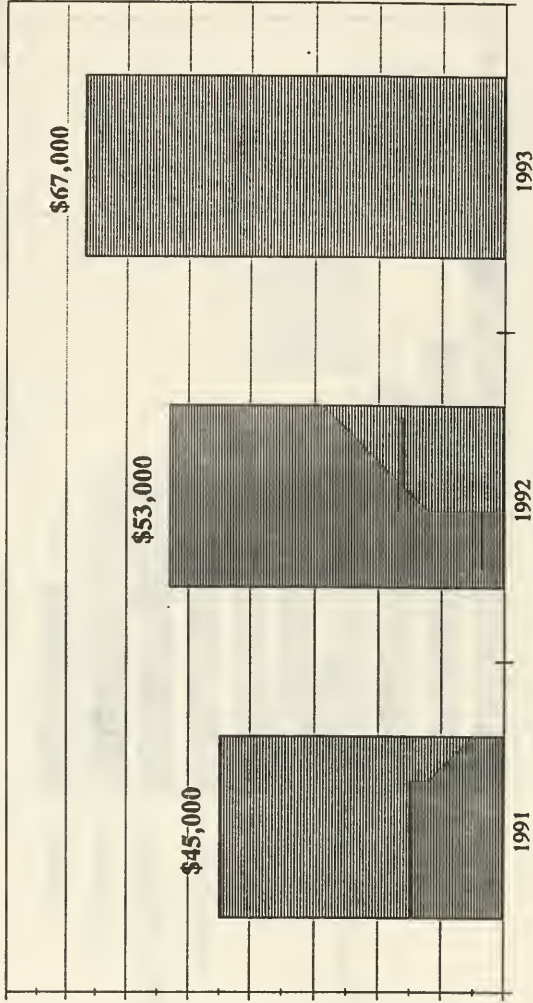
# Top 10 Companies - R & D Spending (Per Employee)



Of the top 10 investors in R&D in the U.S., 7 are biopharmaceutical companies (Biogen, Genentech, Centocor, Amgen, Chiron, Genetics Institute and Immunex).

Source: BusinessWeek

## Biotech Company R & D Spending (Per Employee) \*



\* Public Biotech Company Average

Source: Ernst & Young



## II. Articles

● "Inevitably or not, the financial condition of many biotechnology companies will soon be critical unless the capital markets revive,' Gensia's David Hale said.

'If the condition persists, you are going to see some new companies shut down or end up in a fire sale of what's left,' Hale said. 'The concern I have is that biotechnology as an independent, viable industry will cease to exist.'"

Chris Kraul, "Backing Out of Biotech," *Los Angeles Times*, June 7, 1993, p.D1.

● "Price controls on new drugs have the real potential to kill this industry. Despite many drugs in the R&D pipeline, not many products are on the market. New capital is constantly needed to keep these companies viable. Government regulation of the rate of return on new drugs through introductory product price controls would prevent investors from anticipating profits commensurate with the risks of investment."

Kenneth J. Widder, "Why the biotech industry is in peril," *San Diego Union-Tribune*, June 20, 1993, p.G-3.

● "The U.S. is at risk of losing its leading position in biotechnology by the end of the decade unless technology exchanges between the U.S. and Japan become a two-way street."

Ann Thayer, "U.S. biotech lead dependent on links with Japan," *Chemical & Engineering News*, May 25, 1992.

MONDAY, JUNE 7, 1993

# Backing Out of Biotech

## Health Care Reform Dampens Enthusiasm of Investors

By CHRIS KRAUL  
Times Staff Writer

**N**oting falling prices for biotechnology stocks, executives of San Diego-based Viagene in March scrapped a \$25-million stock offering, froze hiring and shelved some of the company's AIDS research until it can raise money elsewhere.

Similarly spooked was Sibia of La Jolla, which gave up on a public stock sale this year. Since then, executives have flown to Europe and Japan to try to hustle \$15 million from institutional investors. They are resigned to signing away twice the equity they would have relinquished in a public sale.

The health care reform cyclone has put a tremendous damper on investor attitudes about biotech. We are being unduly punished," said Frank Kung, president of Genelabs Technologies in Redwood City, which sold stock to a German company in a private deal last month after also giving up on the stock market. These cash-hungry companies fear that biotechnology's current troubles are not just another cyclical slump, and that national health care reform will sour investors on biotech stocks for months, even years, to come.

Although published reports say President Clinton's task force on health care reform is backing away from proposing strict price controls on drugs, they fear that the final plan will include some mechanism for putting serious restraints on drug prices.

Investors fear that biotech companies will have difficulty recouping profits from their enormous investments in developing drugs for market, they add.

Indeed, the 40% drop in biotech stocks since the Clinton Administration took office in January reflects that fear.

"Everybody's a little squeamish about [investing in] the

### Biotech Slump

A long slump in biotechnology stocks has caused biotech companies to avoid stock markets as a means of raising money. From a total of 70 biotech offerings in 1991, the number of issues declined to 40 in 1992 and has been declining since January as has the amount of money raised from stock offerings.

#### Number of offerings in 1993

January	13
February	6
March	6
April	3
May	2

#### Millions of dollars raised in stock offerings in 1993

January	\$382
February	\$134
March	\$100
April	\$77
May	\$31

Source: Haverhill & Quist

Los Angeles Times

whole pharmaceuticals and health care industry because it still isn't clear what's going to happen," said William T. Comer, president of Sibia, which is developing a treatment for epilepsy. "And until there's some kind of clarification, especially in the pricing structure of drugs, you won't see investors get excited about us."

If the market fails to rebound soon, biotech executives say, there will be a fundamental transformation of the industry, with a trend toward consolidation accelerating. Additionally, they say, foreign drug firms will probably take an increasing share of the American-born industry as they sense there are bargains to be had.

Last week, Rhone-Poulenc Rorer, a French-owned maker of prescription and over-the-counter drugs, said it will pay \$113 million for a 37% stake in Applied Immune Sciences, a Santa Clara biotech firm specializing in sophisticated cell and gene therapies. The principals in the deal said

Friday that they have been talking since last fall and that the timing of the French company's announcement was coincidental to the slump in stock prices.

Earlier in May, Boehringer Mannheim agreed to a \$14-million deal to buy stock in Genelabs Technologies and finance some of the company's research. Genelabs' Kung conceded afterward that he would have driven a "much harder bargain in a more relaxed manner" with the German firm if the stock market had not soured.

Companies such as Genelabs have huge cash needs because of expensive drug development programs, in which they spend from \$1 million to \$4 million a month developing and testing drugs in labs and hospitals. And since most companies have no product sales and just 12 months to 15 months worth of

Please see DRUGS, D4

Continued from D1  
operating capital in the bank, they are feeling increasing pressure to make deals with other U.S., Japanese and European investors.

"The airways from here to Japan are full of biotechnology executives trying to arrange investment deals," said David Hale, chief executive of Genzia Pharmaceuticals in San Diego.

But the biotech companies are finding that these potential investors—mostly large domestic and foreign drug companies—are driving hard bargains.

"The possibility that introductory prices of biotechnology drugs may be subject to controls has caused some investors concern in terms of getting a satisfactory return on their extremely high-risk, early-stage investments," said Steven C. Mendell, former chief executive at Xoma of Berkeley who left recently to start up Prism Pharmaceuticals in San Diego.

Ell Lilly, which has invested in 40 biotechnology companies as a way of keeping an eye on emerging drug development, has tightened its standards to the point that it will no longer buy into a biotechnology company that has only one or two drugs in the pipeline, chief scientific officer Leigh Thompson said.

"There just aren't many winners in the industry," Thompson said on a recent visit to San Diego, where Lilly's Hybritech biotechnology unit is based.

The irony is that up until six months ago, investors could not seem to get enough of biotechnology. Between January, 1991, and June, 1992, biotechnology companies raised about \$8.5 billion in stock sales, nearly as much as in the entire previous decade, said Steven Burrell, national director of Ernst & Young's biotechnology practice in San Francisco.

During that time, biotech stocks such as Genzia Pharmaceuticals, Immune Response and Synergen sold at stratospheric prices pushed up by the "leading frenzy," said Pat Sullivan, a Coopers & Lybrand partner in San Diego who handles biotech clients.

Now, with health care reform on the horizon, there is the perception that 1,200 biotech companies is too many and that the "process of natural selection" will soon accelerate, Thompson said.

Some see the stock market's cooling off as simply a stage in the maturing of a still young industry—of a new "sense of realism" in the aftermath of the failure of three highly touted anti-sepsis drugs to gain FDA approval in the last year, said Jacqueline Siegel, chief financial officer at Isis Phar-



DAVE GATLEY / Los Angeles Times

Tina Berger, Steven Mendell of Prism Pharmaceuticals in San Diego.

maceuticals, a Carlsbad biotechnology company.

"There's a growing awareness on the part of investors of what we go through to get these products developed," said Howard E. Greene, chairman of Amylin Pharmaceuticals, a San Diego biotech company working on a treatment for diabetes. "Large drug companies have never talked about individual drug development. They don't like to get up and make predictions until they have the new drug in the bag, so to speak."

"Only with the emergence of biotechnology has Wall Street got to watch, step by step with painful clarity, the difficult process of developing a drug," Greene said.

Another indication of a maturing industry is that prospective investors are more discriminating.

"Whereas in the past you dazzled them with science or laboratory or animal experiments, now [potential investors are] focused on human clinical trial results," Greene said.

And investors' patience is shorter, Sibix's Comer said. Companies hyping stock offerings a year ago were able to sell shares by projecting product sales by the end of the decade. "Now you have to have a reasonable chance of having a product on the market by 1996 or

[companies trying to raise capital] have a tough sell to investors."

Inevitably or not, the financial condition of many biotechnology companies will soon be critical unless the capital markets revive, Genzia's David Hale said.

"If the condition persists, you are going to see some new companies shut down or end up in a fire sale of what's left," Hale said. "The concern I have is that biotechnology as an independent, viable industry will cease to exist."



The following article appeared in THE WALL STREET JOURNAL, issue of May 25, 1993.

# Clinton Health Plan Hurts Biotech Firms

By UBAYAN GUPTA

Staff Reporter of THE WALL STREET JOURNAL

If uncertainty about President Clinton's health-care plan is denting big drug companies' stocks, it is helping to wreak havoc at small biotechnology companies.

Ever since the administration started talking about health-care changes, the fear of price and cost controls has hurt the biotech business. On Wall Street, stock prices of biotech companies have plummeted. Financing has dried up. And plans for expansion, including hiring, new construction and new projects, have been put on hold.

The entire biotechnology industry is under a cloud. But small biotechnology companies are the hardest hit. With no products and no revenue, they need steady access to the capital markets. The drought they now face threatens their plans for research and commercialization—and, for some, their very existence.

Of course, the industry hasn't helped its own cause. Problems with some highly publicized drugs and the industry's inability to come up with new blockbuster have tarnished its image. And a slew of me-too companies backed by venture capitalists have further clouded the competitive picture.

## Other Setbacks

Initial public offerings in the first four months of this year fell 63% from the 1992 period to \$119.7 million, according to *In Vivo*, a Norwalk, Conn., industry newsletter. More than a dozen companies, including Triplix Pharmaceutical Corp., GenPharm International Inc. and Tasek Biosystems Inc., have put their stock offerings on hold. Others, such as Viagen Inc., which had postponed previous offerings following other industry setbacks, have simply canceled public financing plans altogether.

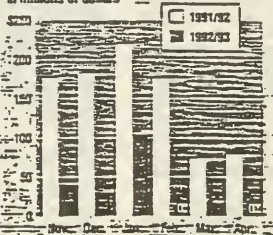
"There's no question in my mind that the Hillary effect has put a nail in the coffin on our ability to raise money," says Robert Abbott, chief executive officer of Viagen in San Diego, referring to the first lady's role as head of the Clinton administration's health-care task force.

Relatively more mature companies have fared little better. Secondary stock offerings declined 11% to \$283.7 million. But the biggest casualty was a package of convertible debt that had been expected to bring more than \$200 million into the coffers of seven small companies, including Celtrix Pharmaceuticals Inc., Cytotherapeutics Inc., Liposome Technology Inc., Neuron Corp. and Repligen Corp.

The uncertainty and speculation surrounding price controls killed the bio-bun-

## Biotech Stocks

Volume of biotechnology initial public offerings following President Clinton's election victory, compared with year-earlier figures, in millions of dollars



Source: Health Care Strategies, Westwood Information Inc.

die. We hit the market at the wrong time," says Misha Perkevich, a managing director at Robertson Stephens & Co., the San Francisco investment bank that put together the convertible debt package.

## Source of Resources

Strategic alliances with big companies have also been affected. Such partnerships, a source of capital and resources such as technology and marketing for smaller companies, dropped to 19 in the first four months of this year from 29 a year earlier, says *In Vivo*. "The large companies are lumbering down because of the uncertainty. They want to know what's going to happen to the overall environment before they do more outside collaborations," says Ron Henriksen, chief executive of Khepri Pharmaceuticals Inc., Alameda, Calif., and former head of U.S. business development at Eli Lilly & Co.

"Investors already have been disappointed by the poor clinical results of some high-profile companies such as Syntergen, Cencor and U.S. Bioscience," says Roger Longman, editor of *In Vivo*. Now, "a host of disparate and confusing reform proposals, ranging from price controls to a national list of reimbursable drugs, has thrown them for a loop."

"The biggest concern is price controls for new products," says John Kawenski, a Denver manager of Global Health Sciences Fund and Financial Strategic Health Sciences Portfolio. "If price controls are put in place you will not see any further financing of these biotech companies."

The Food and Drug Administration is also contributing to the industry's quandary. The big FDA signals are that the threshold (for approval) has changed from



# HOUSTON BUSINESS JOURNAL™

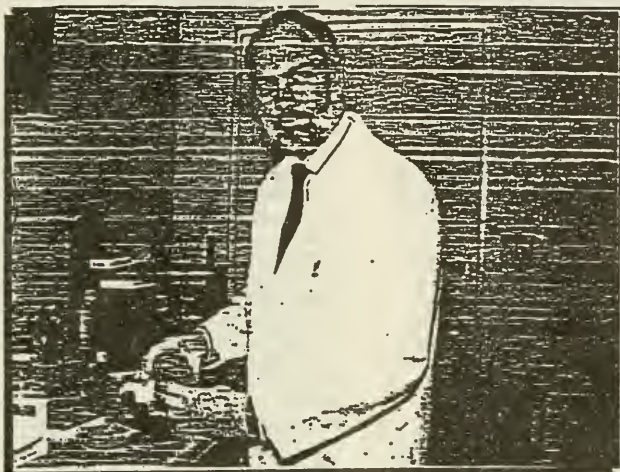


PHOTO BY BETTI LAMAR

Bohannon: 'The guy with the money dictates the terms'

## Big ideas, but little money: Biotech wildcatter stumbles on Wall Street

By Danni Sabota

Robert Bohannon has developed a vaccine for polio, but he can't sell it. He has discovered an AIDS-like retrovirus and invented a vaccine to treat it, but he can't sell that, either.

Bohannon is president of an obscure Houston biotechnology firm called Onasco Companies Inc. He has some brilliant ideas, but he's too broke to bring them to market.

His corporation's stock trades publicly, but Bohannon has basically become its sole financier. The sporadic thrashing of biotech stocks has quelled his hopes of gathering more money off of Wall Street anytime soon.

"Basically I've been funding the company out of my own pocket, and I ran out of money," Bohannon admits. "I just can't put any more money into it."

Onasco is a rarity in the wildcating world of biotech. Unlike most biotechnology ventures that hit the stock market, this small company actually has a couple of untested but fully developed products. The Food and Drug Administration and the Centers for Disease Control even use Onasco diagnostic kits in their laboratories. But the financial end of this medical business has stumbled on such hard times that Bohannon has boxed up

*Obscure Onasco going broke despite discovery of new polio vaccine*

safety and efficiency to safety, efficacy," and cost effectiveness, says Steven Burrill, head of Ernst & Young's international high technology practice. For most young companies, unfamiliar with the regulatory process, the confusion only adds to the already prohibitively expensive cost of clinical trials, he adds.

But at Viagene, which in March abandoned its \$30 million initial public offering, the implication is clear. The company has frozen hiring and drastically slowed its plans for development and diversification.

Five years ago, Viagene received \$20 million from venture capitalists to develop drugs based on gene therapy. Last year, it decided to raise \$50 million in an initial public offering to accelerate the clinical trials of its most promising drug, a treatment that enhances a patient's "killer T-cell" response to fight viral infections, including HIV, the virus that causes AIDS.

The company filed to go public on April 15, 1992, the same day that Cencora's announcement of problems with its septic-shock drug sent the entire biotech market into a freefall. Viagene tried again to raise money in January, just weeks before Synergen announced that its septic-shock drug Anril performed poorly in clinical tests. The company kept its offering on the backburner, hoping that news and market conditions would improve. But in March, "I reluctantly terminated Viagene's efforts to raise capital through a public offering," Dr. Abbott wrote U.S. Rep. Pete Stark, a California Democrat.

As a result, instead of accelerated testing or diversifying to other diseases, Viagene is cutting back on its clinical trials. In its first study it will work with only four patients instead of 12. It will also cut out a "quick peek" test that helps ascertain the potential impact of the clinical trials. The revised strategy will reduce costs but it will also add six months to the trials.

#### Conserving Cash

Viagene has also stopped hiring. Between January 1991 and October 1992, the company increased its staff to 107 from 42. But now, with only about \$5 million left, it wants to conserve that cash.

The company is discovering that there is no U.S. corporate interest in its activities. A major U.S. vaccine producer cut off talks about a product-development alliance because of the fiscal uncertainty associated with President Clinton's reform, says Dr. Abbott. Viagene still has five collaboration candidates, but three are Japanese

pharmaceutical companies and the other two are German.

Other companies are also scrambling for new partners to make up for the paucity of public capital. Vertex Pharmaceuticals Inc. last month signed a collaboration agreement with Japan's Kissei Pharmaceutical Co. to develop the Cambridge company's anti-AIDS compounds. As part of the deal, Kissei will invest \$20 million in Vertex's HIV program.

Another Cambridge, Mass., biotech company, Procept Inc., was counting heavily on a \$20 million initial public offering to finance clinical tests for its AIDS therapeutic drug. But it has had to put off the offering, says Stanley Erick, chief executive officer. Now it is scrambling to put together an \$11 million private financing to stay on course.

But even these private equity markets, traditionally less sensitive to industry upheaval, have become wary. Mr. Kawata, for example, invested \$1 million in Incyte Pharmaceuticals, a Palo Alto, Calif., start-up, at a price "at least 50% lower than six to 12 months ago."

Other venture investors simply won't invest. "We're rejecting deals that three or four years ago we would very seriously consider," says Barry Weinberg, managing partner of CW Ventures, a New York venture-capital firm. No more start-ups with products that are only incrementally different from others, he says. "For companies that don't offer cost-effective solutions, there simply isn't any money."

# OPINION

## Why the biotech industry is in peril

By KENNETH J. WOODER

**T**he biomedical industry, long-heralded as an economic bright spot for San Diego, is potentially in trouble. This uniquely "American" industry, where we by far dominate the rest of the world, is extremely vulnerable. The vast majority of companies in this industry rely to a great extent on money from capital markets to support the laboratory infrastructure and clinical trial process necessary for product approval.

This appetite for capital is enormous. For example, \$3 billion was raised by biotechnology companies in 1991 through the public markets. More recently, in January of this year, \$200 million was raised. But the sad story is revealed in February and March when only \$17 million was raised in initial public offerings.

Aside from a temporary surge in stock prices last fall, biotech stocks since January this year have declined approximately 50 percent in value.

This decline is partially due to some highly visible products that failed in clinical testing but, to a greater extent, has resulted from some statements made by President Clinton.

What has happened to dramatically decrease the appetite of investors for biotechnology?

In March, President Clinton, unhappy with the rising cost of prescription drugs, began floating the concept of price controls for the pharmaceutical industry.

This rhetoric precipitated panic among fund managers who buy speculative biotechnology stocks. Not only did these portfolio managers dump biotech stocks, but at the same time the "window" for selling new shares to raise much-needed capital came slamming down.

Only a few biotech companies currently have product sales sufficient to sustain their internal research and development (R&D) costs (35 percent of all costs incurred by biotechnology companies are for R&D).

Access to the capital markets has all but dried up for these companies. The capital markets react poorly to uncertainty and the president has certainly provided that.

Price controls on new drugs have the real potential to kill this industry. Despite many drugs in the R&D pipeline, not many products are on the market. New capital is constantly needed to keep these companies viable. Government regulation of the rate of return on new drugs through introductory product price controls would prevent investors from anticipating profits commensurate with the risks of investment.

Bear in mind that it takes, on average, 10 to 12 years from the time of discovery until a drug reaches the market in the United States.

With the potential for limiting their "reward" for bearing a tremendous investment risk, these investors will go elsewhere for their investments.

As a result of the inability to raise capital by small independent biotechnology companies, the major remaining method of obtaining capital is to partner with, or be acquired by, large multinational pharmaceutical companies.

Given the dollar's decline against many foreign currencies, debilitated biotech companies are doubly cheap for foreign pharmaceutical giants. If the situation does not change, the U.S. biotechnology industry as it now exists will be gone within two to three years. So much for keeping our competitive and technological world lead in this industry.



THE SPENTON



## ONASCO

(continued from page 1)

his laboratory and moved it into a 15-foot square office space in west Houston.

The inventor and his chief operations officer, David Banker, have whittled their four-person staff down to nobody but each other. Now they're temporarily reining in their dreams and waiting out the next three to six months in hopes of securing some new financial support.

With a wife and three teen-agers at home, Bohannon keeps an unusually upbeat attitude about his shrinking venture. The doctor cackles as he talks about investing \$150,000 of his own money to create a dozen products that he can't sell and develop 20 or 30 patents that he can't file.

"Basically," he says, "we're going to have to face reality and get a job some place."

## THE STUDENT'S DISCOVERY

Onasco's story started happily enough. Bohannon expected better things.

In 1991, he was studying AIDS patients for his doctorate at the Baylor College of Medicine when he discovered evidence of a Type-D retrovirus in a human blood sample.

"Retroviruses are bad news, because they take a long time to develop into anything," he says. "I've found one case for sure where a person has the antibody. I'm anticipating a couple more cases."

No one's sure about the ramifications of this retrovirus, but Bohannon developed two diagnostic kits to test for it. He offered them to Baylor for further development, but the university's biotech business incubator wouldn't fund a product that was so new and obscure, Bohannon says.

An investor offered to pony up \$250,000 in exchange for 25 percent to 50 percent interest in the company, Bohannon says. His other option was merging into a shell company.

Investors in a dormant corporation offered a \$500,000 cash infusion in exchange for 20 percent of the equity. So Bohannon took the merger option and signed the contract less than a week after completing his doctoral work at Baylor.

His luck ended there. When Onasco filed its paperwork with the Securities and Exchange Commission, the stock market was fertile ground for biotech public offerings. In early 1992, the high-risk stocks were darlings on Wall Street. Unfortunately, that window of opportunity slammed shut by the time the company's stock offering made it to the market last May.

The \$500,000 in funding never materialized, Bohannon says, so he started pitching in his own money to keep things going until he found another source of financing.

"I wouldn't do it again," he admits. "I wouldn't do it with a public company. If there was a mistake, it was merging with a public company."

On the other hand, Bohannon never had much luck extracting money from venture capitalists. The one deep-pocketed investor who did make an offer demanded 50 percent of his company in exchange for \$250,000.

"Most venture capitalists are out of money or they don't understand our product," Bohannon says. "It's hard to get to first base with somebody who has the dollars. Cash is king. The guy with the money dictates the terms."

## HARD LESSONS

Bohannon's experience is sadly common among biotech entrepreneurs. Doctors and researchers who stumble onto marketable ideas may have scientific know-how, but their naivete about financing often gets them into trouble.

"I'm the guy who comes up with new products," Bohannon explains. "I'm the creative 'genius' behind the company. My strength is not in raising money. I don't hobnob with investment bankers and accountants."

Carrying a biotech product from inception to the market costs an average of \$250 million. But experts in biotech financing point out that not every scientific creation needs an entire company built around it. Often the best way to bring a product to market is to sell the licensing rights to a pharmaceutical giant that can foot the bill for development.

"There is such a big difference between the research and the development side," says Bill Mullaney, managing general partner of Ventures Medical Management Corp.

Bohannon took a big risk when he merged into a public shell company. In the shell game, an entrepreneur eager for financing merges into a dormant corporation that's no longer in opera-

tion but still holds a slot on the stock market. Ideally, the new company taps quick cash from investors. But the deals often fall apart, leaving business owners with virtually worthless stock and bitter memories.

"The shell game is a move of desperation," explains Jay Herson, president of Applied Logic Associates, an independent consulting firm that assists biotech firms in maneuvering through the FDA approval process. "A lot of people think that a public company makes it easy to get public money, but with the market being as eccentric as it has been, it's very complicated."

Hitting the stock market allows venture capitalists who backed the start-ups to finally reap some return on their investments, but biotech companies generally wait a couple of years before going public. Herson suggests that Onasco probably shouldn't have gone public so soon. Still, he concedes that the proliferation of biotech companies in Houston makes it difficult for start-ups to compete for capital.

As a public company, Onasco now has little chance of attracting private venture capital support. Taking the company private again would be a complicated and expensive process.

"The legal part of this would scare the heck out of me," Mullaney says. "I'd always have an uneasy feeling that there was some kind of land mine ahead. You have to live with these investments for a long time, so you'd hate to have some legal problem crop up later on."

Meanwhile, Bohannon stays optimistic. He's banking on a European pharmaceutical company to purchase his products' market rights as well as some equity in the company. To keep food on the table, Bohannon says he'll take another job and act as a part-time consultant to Onasco.

"This has been difficult," he says. "I'm disappointed but optimistic. It'll be tough, but we'll make it." ■



## U.S. biotech lead dependent on links with Japan

The U.S. is at risk of losing its leading position in biotechnology by the end of the decade unless technology exchanges between the U.S. and Japan become a two-way street. This is the view taken in a new report, "U.S.-Japan Technology Linkages In Biotechnology: Challenges for the 1990s," from the National Research Council's Committee on Japan. Cochaired by Hubert J. P. Schoemaker, chairman and chief executive officer of Centocor, and G. Steven Burrill, national director for high-technology industry services at professional services firm Ernst & Young, the committee evaluated current relationships between Japanese and U.S. firms, universities, and research institutions to assess their long-term impact.

The U.S. is considered to be the world leader in biotechnology in both basic and applied science, the latter having been demonstrated through the commercialization of new products. Biotechnology also is an area of tremendous anticipated growth. Product sales for the industry were \$2 billion in 1990 and are estimated to reach more than \$30 billion by 2000.

Having emerged from a "premier scientific and technology base," fueled by the U.S.'s venture capital and public market system, the biotechnology industry ranks second only to the computer industry in market valuations created among high-technology companies. However, the committee questions whether biotechnology will go the way of semiconductors and lose its lead, or remain competitive and reap profits from its investments.

"The overall lead that U.S. firms enjoy today in biotechnology R&D is insufficient to guarantee future competitive success," says the report. "Japanese firms present a significant competitive challenge, one likely to grow in the years ahead."

Japanese ties to the U.S. take a variety of forms. Unlike the U.S., Japan does not possess the same type or number of small, entrepreneurial biotechnology companies. Therefore, it looks to tap basic research and product development from U.S. companies or universities. In addition, Japan links itself to small U.S. companies through acquisitions, equity interests, joint ventures, and R&D contracts. More than half of such ties, though, are in the form of product licensing and marketing deals. And the nation's relationships with U.S. universities—including funding, corporate liaisons, licensing, and contract research—are increasingly prevalent.

According to the report, a troublesome factor in this exchange is that most technology transfers are one-way—from the U.S. to Japan. But increased cooperation will be both "desirable and inevitable," as biotechnology becomes an even more significant part of a global economic and technology base. Future technology linkages with Japan, the committee concludes, must ensure that the U.S. clearly benefits through ties that strengthen manufacturing, expand participation in marketing, and ensure technology transfer back to the U.S.

A critical issue, the committee believes, is intellectual property protection. Many chief executive officers of U.S. biotechnology firms, says the report, see a gap between U.S. and Japanese intellectual property protection as a major hindrance to their independent participation in Japanese markets. The committee suggests the U.S. government give serious consideration to moving to the "first-to-file" system of intellectual property rights protection used in Japan and most other countries.

Both the Japanese government and industry have made biotechnology a national priority and view it as a critical technology for future growth. Together, they are said to be developing broad-based strategies to use biotechnology as a base to move into diverse new business areas. The U.S. government, in cooperation with industry and academia, similarly needs a technology strategy, says the report.

"If conscious strategies are not developed . . . to increase inflows of technology from Japan and to expand marketing and sales in Japan, the net result of increasing technology linkages in biotechnology will be to create significant competition from Japan without strengthening the ability of U.S. firms to compete and commercialize technologies," the report says. It adds that U.S. companies need to focus on areas in which Japan excels, such as second-generation products, product improvements, and technology commercialization, and that universities need to develop guidelines for reciprocal access to technology from Japan.

Ann Thayer

Aside from removing the threat of price controls, Clinton could go a long way toward stimulating the industry by moving ahead with a reduction of taxes levied on capital gains. In February, bills were introduced in the House and Senate that would give a tax break to investors in small businesses, a category into which most biotech companies fall.

Also, the bureaucratic disarray of the Food and Drug Administration (FDA), resulting in long delays for approval, has served as another governmental impediment to biotech companies.

With dwindling resources, the long-extended time for product approvals could well be the straw that ultimately breaks the corporate backs. The irony will be that approvals finally come to companies who have already gone bankrupt while in the "waiting game."

If President Clinton really wants to reduce health care costs, he should start by streamlining the FDA. The costs incurred by companies awaiting approval are staggering, and the longer they wait the higher the passed-on costs.

As an industry, biotechnology companies are equally concerned about rising health care costs. We are prepared to support federal action which creates strong incentives to limit future price increases in exchange for the right to continue to set introductory prices in accordance with the need to provide vigorous equity capital investment in our industry. Biotechnology companies have been, and will continue to be, socially responsible in setting introductory prices for their products.

The reasonableness of U.S. biopharmaceutical prices is illustrated by a comparison to the prices of identical products in Japan, where the government-set price is two to three times higher than the company-set prices in the United States. Our industry is committed to achieving profitability through innovation, not through inflation of existing drug prices.

The biomedical industry desperately needs the administration's attention in setting the industry back on course.

This industry represents a significant number of good-paying jobs (87,000 directly — 14,000 of which are in San Diego County — and perhaps 100,000 more indirectly), with the potential for creating over a million jobs within the next 10 years.

However, like any adolescent industry, it needs care and nurturing.

But most of all, it needs this president to clearly articulate his intentions toward the industry and clear the roadblock of bureaucracy to allow this last uniquely American industry to flourish.

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WIDDER is chairman and chief executive officer of Molecular Biosystems Inc., a San Diego-based biotech firm.

### III. Press & Analyst Quotations

- "Given the uncertainty concerning the new healthcare legislation, there is a great deal of concern over the future of the bio-pharmaceutical industry." *Venture Economics*
- "Few investors want to risk their money before knowing what the 'Hillary Factor' will do to healthcare in general, and biotech companies in particular." *Bioventure Stock Report*
- "Healthcare reform's impact on access to investment capital remains the industry's major concern, because most companies have not yet put enough products on the market to sustain their huge research and development costs." *Los Angeles Times*
- "The downturn has been exacerbated by fears that the Clinton Administration's forthcoming healthcare-reform plan will place strict controls on the price of prescription drugs, severely limiting the profitability of biotech firms." *In Vivo: the Business & Medicine Report*
- "Biotech stocks continue to be weak due in part to the overall fear of Clinton healthcare policies and their possible impact on the ability to raise capital and on V.P. Gore's fence-straddling biotech policy which professes to be supportive in distinguishing biotech from pharmaceutical products but calls for more regulation." *Merrill Lynch*

## Press Quotations

### ● *Venture Economics*

"Given the uncertainty concerning the new health care legislation, there is a great deal of concern over the future of the bio-pharmaceutical industry. This uncertainty causes professional investors to back off from making investments in such companies, especially new companies. The strong investment activity in the second half of 1992 seems to indicate that venture investors are willing to invest in biotechnology companies, but only those companies that have previously received venture capital financing (i.e., their own portfolio companies)."

Matthew Yost, July 13, 1993

### ● *Bioventure Stock Report*

"George Rathmann, CEO of ICOS Corp., voiced serious concerns in a keynote address about the direction and focus of the Administration's discussions to date on healthcare reform. The uncertainty surrounding these debates and the proposal for government-mandated drug price controls have contributed substantially to the capital markets turning away from the biotechnology companies, even though only seven percent of healthcare expenditures are for drugs. Biotech drugs make up only a small part of that seven percent.

Rathmann maintained that any significant government-mandated price controls will injure the pharmaceutical industry, but destroy the biotech industry. He said that the idea that drug costs are a huge problem that has to be fixed is a misconception."

Scott Morrison (Arthur Anderson), "Navigating Through Change,"  
July/August 1993, Volume 1, Number 4, p.1.

### ● *Bioventure Stock Report*

"Professional investors are talking tough these days about biotech stocks, if they bother to talk about them at all. Near-term expectations (focused on the next three to six months) for the biotech companies is zilch right now, thanks to recent nose-dive in stock market valuations. 'Long' term expectations for the group (i.e., the next 18 months) aren't much better: Few investors want to risk their money before knowing what the 'Hillary Factor' will do to healthcare in general, and biotech companies in particular."

Paula Szoka, Ph.D. (BioBusiness Resources Inc.), "Buy-Side Sings Biotech Blues," July/August 1993, Volume 1, Number 4, p.10.



● *Los Angeles Times*

"Fears that drug price controls and other restrictive measures might be a part of the reform package have already caused a few California biotechnology companies to scrap stock offerings, delay research and freeze or cut jobs.

Health care reform's impact on access to investment capital remains the industry's major concern, because most companies have not yet put enough products on the market to sustain their huge research and development costs."

Chris Kraul, "Biotech Blossoms," July 28, 1993, p.D1.

● *The Business Journal*

"Biotech could wither,' said Peter Jansen, CFO at Genelabs Technologies Inc. in Redwood. 'Today, there are about 1,000 biotechs in the United States, most of them small. Some will bring out beneficial products, and we could lose a lot of it if health care reform is not well managed.'

Now, President Clinton has put the fear of reregulation in the hearts of biotech firms. 'I think it's fairly clear the market feels that way. The (biotech) stocks have been depressed in part because of this,' Mr. Jansen said. 'Do we think that also? We do. We seem to be getting lumped in with the health care problem.'"

Jim Nash, "Biotech backlash is feared byproduct of federal reform," April 12, 1993, p.4(1).

● *In Vivo: the Business & Medicine Report*

"As their own earnings problems loom in front of them, few companies have yet come to grips with how much of their research budgets they will trim, but they recognize that budget cuts are inevitable.

Biotech price restraints also make large companies worry more about the manufacturing cost of biotech products. Says a Pfizer executive: 'If we can't price where we want to, if we have problematic production margins, we simply won't do the deals. Bringing in any kind of a deal is a struggle: if you add that additional (production cost) caveat in the current environment, the hurdles rise even higher.'

The downturn has been exacerbated by fears that the Clinton Administration's forthcoming healthcare-reform plan will place strict controls on the price of prescription drugs, severely limiting the profitability of biotech firms.

While venture capital money is continuing to pour into start-up firms, biotech executives and analysts said companies at the mezzanine level and those that have just gone public in the last few years are encountering the most difficulties in obtaining funding. Biotech companies are particularly vulnerable to a downturn in stock prices, since the majority are not profitable and rely on equity markets to raise capital."

R.L., March, 1993, p.4.

● *Chemical & Engineering News*

"According to the Institute for Biotechnology Information (IBI) at the North Carolina Biotechnology Center in Research Triangle Park, U.S. biotechnology firms made about 700 alliances in 1992. About 58% of the alliances were between two U.S. companies and 38% were between a U.S. company and a foreign company, IBI says. In 213 alliances with foreign partners, Japan accounted for 20% and other countries with major pharmaceutical corporations – such as the U.K. and Switzerland – accounted for 19% and 13% respectively."

Ann M. Thayer, "Biotechnology Industry Looks to More Creative Financing Options," August 23, 1993, p.10.

### Analyst Quotations

● *Robertson Stevens & Co.*

"The biopharmaceutical stocks were also buffeted by the major political uncertainties surrounding the health care debate. The new Administration's attacks on pharmaceutical prices and the potential for the rigid cost controls common in Europe and Canada have resulted in investors fearing that they will be unable to recoup their capital, let alone a satisfactory return on their investments, by investing in health care stocks, particularly biotechnology stocks, even though the industry has not been the specific focus of cost-containment discussions.

..... the political rhetoric directed toward the pharmaceutical industry has resulted in very negative repercussions for the biopharmaceutical stocks....."

Mark J. Simon, Michael P. Walsh, "Biopharmaceutical Quarterly - Investment Perspectives on Selected Biotechnology Companies," May 14, 1993.

● *Merrill Lynch*

"Biotech stocks continue to be weak due in part to the overall fear of Clinton healthcare policies and their possible impact on the ability to raise capital and on V.P. Gore's fence-straddling biotech policy which professes to be supportive in distinguishing biotech from pharmaceutical products but calls for more regulation."

"Merrill Lynch Global Securities Research - Biotechnology - Reasons to Buy Genzyme and Protein Design Now," June 24, 1993, p.2.

● *Fidelity Investments*

"Biotechnology companies have begun to feel the heat of government displeasure with the high cost of healthcare."

"A User's Guide to Fidelity Select Portfolios," 3/31/93.

● *Bear Stearns*

"For the biotechnology industry, it has mainly been a case of guilt by association with the pharmaceutical industry.

With the exception of the top firms, biotechnology companies are extremely dependent on the financial markets for operating funds. In times of limited access, as we are witnessing now, biotechnology companies must truly streamline their efforts in order to conserve cash."

"Bear Stearns Biotechnology Industry Equity Research - Biotechnology vs. Pharmaceutical - There is a difference," 6/11/93.



BIOTECHNOLOGY  
INDUSTRY  
ORGANIZATION

November 3, 1993

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The Honorable Paul Kanjorski  
Chairman, Subcommittee on Economic Growth  
and Credit Formation  
109 Ford House Office Building  
Washington, D.C. 20515

Dear Mr. Chairman

I very much appreciated the opportunity to testify before the Subcommittee on Economic Growth and Credit Formation. BIO recognizes the jurisdiction of the Banking Committee over price controls and that is the top legislative priority for the U.S. biotechnology industry.

Let me follow up on my testimony with the following information:

- Professor Bill Wetzel's phone number is 603-862-3369 and his fax number is 4468. He knows more about the private capital markets than anyone. He can give you details on how the Federal Government could support the existing, private sector venture capital networks.
- In terms of reforming the recently-enacted targeted capital gains incentive, I have seven suggestions:
  - a. Raise the capitalization limit from \$50 to \$100 million so that slightly larger companies can qualify.
  - b. Index the \$100 million ceiling for inflation.
  - c. Provide a capital gains incentive for corporate taxpayers, not just individual taxpayers.
  - d. Cover investments in SBIC's.
  - e. Defer taxes on the gains on the sale of stock in a qualified small business (whether or not the investment was made before or after the effective date in the Act) if the gains are reinvested in another qualified small business.

1625 K STREET, N.W., SUITE 1100  
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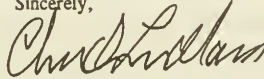
The Honorable Paul Kanjorski  
November 3, 1993  
Page Two

- f. Repeal the "2 year/50%" working capital rule that forces small companies to raise less capital or spend it faster to avoid losing gains benefits for their investors.
- g. Provide a "valid business purpose" exemption to the anti-redemption provision.
- 3. In terms of the R and D credit, we urge you to make the current credit permanent, provide for partial refundability of the credit for small firms that sustain their research and development effort, and not enact the "stock option spread" limitation on the expenses that can be counted towards the credit.

I look forward to working with you, particularly on the health care reform plan. I am happy to consult with you about your interest in capital formation. Please feel free to call on me at any time.

Thank you again for your invitation to testify.

Sincerely,



Chuck Ludlam  
Vice President for  
Government Relations

CC. Robert Hall  
Chris Boam  
Mike Radway  
Mary Weaver  
Robert Zimmer

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Statement of

Erik R. Pages

**Business Executives for National Security**

before the

House Committee on Banking, Finance & Urban Affairs  
Subcommittee on Economic Growth and Credit Formation

October 26, 1993

Mr. Chairman, Members of the Subcommittee, thank you for inviting me to join you today. I commend you for holding hearings on the important topic of financing for new high-technology companies. I am Erik R. Pages, Director of the Defense Transitions Project at Business Executives for National Security (BENS). BENS is a national, non-partisan organization of business leaders working to strengthen national security by promoting better management of defense dollars, advocating measures to make the economy stronger and more competitive, and finding practical ways to prevent the use of weapons of mass destruction. Our members represent a range of industries--including several in the venture capital business.

BENS is interested in today's discussion because of our work in promoting successful diversification by defense businesses. In our view, efforts to improve the overall availability of financing for high-tech firms will have a positive spillover effect in promoting defense conversion as well.

Our approach to defense conversion is to avoid the almost religious debates on whether businesses can convert or not. Instead, we have focused on "what works" and have utilized this approach to examine how small businesses are responding to defense cutbacks. From this, we have developed guidelines for firms trying to diversify their business base as well as a series of recommendations for how government can help diversifying businesses and remove the obstacles that make conversion so difficult.

BENS has worked with its members from across the country to examine how defense firms are faring in their efforts to enter commercial markets. We've also advised numerous state and local efforts on how to support business diversification.

The findings of our defense conversion studies and interviews with company CEOs are remarkably consistent. We have found that the biggest obstacle facing diversifying defense firms is obtaining access to working capital. Nearly every CEO with whom I have spoken cites financing as their number one problem. This evidence is backed up by numerous state and local surveys of the needs of defense contractors. Studies by St. Louis County, Missouri, Massachusetts, Virginia, New York, Connecticut, Texas, and many others all point to financing as a critical obstacle to entering commercial markets.

### CAUSES OF THE PROBLEM

I know that the Committee is familiar with the many causes of the economy-wide credit crunch. For a number of reasons, banks have been less willing to offer financing for small businesses. At the same time, other sources of start-up capital have also become less readily available. In particular, there is evidence of a major decline in venture capital financing for start-up companies. As you know, this source of financing played a critical role in creating companies such as Apple, Genentech, Microsoft, and Lotus, that are now household names.

Some figures developed by Venture Economics illustrate this change. Between 1987 and 1992, the value of venture capital investments in start-up companies declined by roughly 65%. Most venture capital outfits have now shifted their investments to lower-risk, later-stage deals. The U.S. venture capital industry still remains the envy of the world. Nevertheless, a traditional source of start-up capital has become more difficult for companies to access.

This credit crunch has an impact on all high-technology firms, but it is especially severe on defense firms trying to enter commercial markets. Banks have been reluctant to loan to contractors for several reasons. First, they remain skeptical about the prospects for defense conversion. This process is inherently



high-risk, and discourages bank lending. Second, bankers often appear equally skeptical about the "market savvy" of defense industry managers. Finally, even when a defense firm shows some commercial success, they frequently have difficulty obtaining financing. This has been especially true in commercial aerospace, where bankers fear future market downturns. I personally know of several cases where defense firms have won commercial contracts, but were unable to secure financing. Without financing in place, they have been forced to forego the contract.

This poses a real dilemma for smaller defense contractors. On the one hand, their old markets are slowly but surely disappearing. At the same time, even when they succeed in retooling, they cannot get financing to enter new markets. When working in the defense world, these firms survived on Department of Defense progress payments. In the commercial world, progress payments don't exist. The company is paid after the contract is completed. Thus, the demand for working capital expands as companies shift more and more of their business into commercial markets.

### POTENTIAL SOLUTIONS

Mr. Chairman, in our view, there is no single solution to this pressing problem. Your own secondary market proposal will certainly help improve access to capital. In addition, this year's changes in the relative taxation of capital gains and dividends/interest from start-up investments will help. Finally, the National Competitiveness Act contains a number of provisions to help expand the availability of start-up capital.

In addition to these steps, there are a number of steps the Committee might consider that specifically target the needs of diversifying defense contractors. BENS is now completing a comprehensive study which provides greater detail

regarding many of these recommendations. We will submit a copy of this report for the record of today's hearing.

- **First, the Committee should examine ways that Washington can expand support for small business incubator and management training services.** In many cases, existing contractors or new start-ups do not receive financing because they have not created realistic business plans. These centers provide valuable services that can help improve the competitiveness of converting businesses before they seek financing.

This type of hands-on help is best provided by state and local agencies. Current federal efforts, such as the Department of Commerce's manufacturing extension centers, should remain focused on supporting technology transfer and manufacturing improvements. Pennsylvania's Benjamin Franklin Partnerships or Ohio's Edison Centers are national models for this type of activity.

Unfortunately, many areas of the country do not enjoy effective programs like those in Pennsylvania and Ohio. For example, California, which has been especially hard-hit by defense cuts, lacks an effectively funded program of this type. To help other states emulate successful programs, the Committee might want to consider creating a new program category under the Technology Reinvestment Project (TRP): the Business Development Program.

The Business Development Program would work in a similar manner as the TRP's other technology deployment programs. Universities, regional bodies, and state and local governments would be eligible to apply for federal funding to support the creation of new business development centers or expansion of existing programs to support the diversification of existing small businesses and the development of new start-up firms. As with other TRP programs, Business Development funds

would be competitively awarded and based on a fifty percent cost sharing by the applicant.

- Second, the Committee might also examine the use of tax incentives to encourage private initiatives which spur entrepreneurship. As you know from hearings held earlier this summer, Grumman, TRW, and other prime defense contractors have established divisions which transfer technology or intellectual property to start-up "spin-out" enterprises. In other cases, contractors have provided space or equipment to these enterprises. For example, Lockheed has donated plant space to CALSTART, an innovative Los Angeles-based consortium developing advanced transportation systems and technologies. Tax incentives might contribute to a major expansion of these beneficial activities.
- Finally, the Committee should also consider more direct means to enhance the availability of capital for defense diversification projects. There have been several proposals for assistance in this area. Some observers have suggested that Washington provide direct financing for conversion projects. Another proposal recently considered by Congress called for creation of a small business loan program administered under the TRP.

Both of these well-intentioned efforts are unlikely to be effective. In the specific case of creating a TRP loan guarantee program, I am concerned because of ARPA's lack of experience in this area. ARPA has proven uncommonly effective in supporting innovative R&D; it has no proven track record in making loans to businesses.

In general, Washington has a poor track record in targeting investments to individual companies. A far more effective model could be based on the creation of a privately-run Fund for Defense Conversion (FDC). The FDC would be organized

as a coalition of venture capital outfits with the U.S. government as the initial investor. The FDC would extend capital on favorable terms--through low-interest, long-term loans, loan guarantees, or purchases of preferred stock--to private firms seeking to convert all or part of their defense activity to non-defense applications. Private firms would be responsible for determining the potential activities to be funded, initiating the application, and, if it is approved, investing their own stake (for example, one-third of the total cost) and implementing the project.

The FDC should not be based on the creation of a single centralized mechanism based in Washington. Financing will work more effectively if the process is decentralized. The best approach entails a competition by private venture capital outfits, investment bankers, and other institutions. Winners of this competition would then be authorized to provide federally-guaranteed loans to worthy conversion projects.

Shifting this responsibility to the private sector offers many benefits. The limited availability of public funds makes it imperative that those monies are spent wisely. Washington's expertise does not extend into the realm of deciding which firms can succeed. At the same time, political factors introduce uncertainty into the appropriations process, and often result in the maintenance of projects after they have outlived their utility. Given these realities, government agencies cannot micromanage the financing process. Such decisions are best left to private sector entities.

Models for this type of activity already exist. There are a number of venture capital firms that have taken an active role in financing conversion initiatives by small defense contractors or divisions of major contractors. These firms could serve as models for groups seeking to invest FDC funds. Since the Corporation represents a major shift in policy, I would suggest that it be considered first as a pilot project or a component of existing programs, such as those operated by the Small



Business Administration. Based on the FDC's early performance, we could then revisit the program and consider its expansion.

### CONCLUSION

Mr. Chairman, supporting the successful transition of U.S. defense firms presents a daunting policy challenge that cannot be solved with a "one size fits all" policy. We need to develop a variety of solutions that tackle different parts of the conversion challenge--including retraining, technology development, and financing. We also need to look at new ways of organizing solutions. Not all programs need to be centered in Washington. The Committee should also examine new forms of partnership with state and local governments and the private sector.

I believe that we have begun to make progress in several of these key areas, but a critical piece of the conversion puzzle--financing--has remained unexamined. I commend you for your efforts to shed light on this important issue and I look forward to working with the Committee as it continues its work.

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November 2, 1993

The Honorable Paul Kanjorski  
Chairman  
Subcommittee on Economic Growth  
and Credit Formation  
U.S. House of Representatives  
109 Ford House Office Building  
Washington, D.C. 20515

Dear Mr. Chairman:

Thank you for inviting me to appear before your Subcommittee last week. I especially enjoyed the roundtable format which facilitates open discussion and real give-and-take. I hope you can persuade other committees to consider this approach.

During my testimony, you requested additional information about our proposal to create a Fund for Defense Conversion. A proposal summary is attached. In addition, we are now in the process of completing a larger study of the importance of start-up financing for defense conversion. This study will be forward to you upon its completion.

I hope these materials are helpful. If you have any questions or need additional information, please do not hesitate to contact me. I look forward to working together.

Sincerely,

A handwritten signature in black ink, appearing to read 'Erik'.

Erik R. Pages  
Director  
Defense Transitions Project

Enclosures

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## Fund for Defense Conversion

### Proposal Summary

Gaining access to capital is the most daunting task facing defense-dependent companies seeking to convert to commercial and/or dual-use production. Thousands of firms want to convert, but lack the capital needed to retool and compete in commercial markets. Bankers, venture capitalists, and other sources of working capital often lack knowledge of the defense industry and have proven unwilling to invest in conversion projects. The Clinton Administration has attempted to support defense firms through its Technology Reinvestment Project (TRP). Though well-intentioned, the plan does not effectively tap the expertise and inherent efficiency of the private sector.

One possible mechanism that utilizes the discipline of market forces is the Fund for Defense Conversion (FDC), first proposed by Bernard Schwartz, Chairman and CEO of Loral Corporation. The fund would be organized as a quasi-public financial intermediary with the U.S. government as the initial investor. The FDC would then raise additional funds within private capital markets, thus leveraging federal defense conversion dollars. The fund would thus link the defense industry, the commercial sector, and financial markets.

#### Purpose

The FDC would extend capital in the form of loans or loan-guarantees to existing venture capital companies or investment bankers. Licensed investors would specialize in financing small to medium-sized defense firms that are attempting to convert part or all of their defense activity to non-defense applications. Private companies would be responsible for initiating proposals for FDC funds, and if approved, implementing the projects. In addition, they would be required to invest their own stake in the project.

This structure helps ensure that approved projects are commercially and financially viable, rather than simply "picked" by the government. The government would be limited to the role for which it is best suited -- providing financial support for the private sector and broadly encouraging the conversion process.

#### Criteria for Investment

The FDC would solicit proposals from venture capital companies and other investment firms, in which the bidding firm would submit a business plan and funding request. Proposals would be judged on the basis of criteria such as 1) the quality of the business plan, 2) the ratio of private capital at risk to the amount of federal funding, 3) the credibility of the investors, and 4) the social returns to the economy in terms of re-deployment of resources, preservation of the defense industrial base, and job creation.

#### Structure

The FDC would not be based on the creation of a single, centralized institution located in Washington. Financing will work most effectively if the process is

decentralized. Existing private firms would compete to qualify as approved FDC institutions in a process similar to that utilized in the Small Business Administration's Small Business Investment Corporation (SBIC) program. Although each FDC would operate independently, a central board of directors (consisting of government and private sector representatives) would oversee the program's overall operations.

After the initial government investment, each FDC would operate on a for-profit basis. However, the Federal government would share in any gains made on investments. These earnings would contribute to a revolving credit fund to be used for future transactions. In addition, the FDC could first be implemented as a pilot project until the effectiveness of the government's investment can be determined.

The use of private investors and the requirements for cost-sharing by defense firms should introduce market discipline into this process. Although the FDCs would focus on defense conversion-related projects, they would be required to maintain diversified investment portfolios. These requirements reduce risk and also help limit the championing of single interests and/or companies. Selection of projects based on technical and economic merit and avoidance of the annual appropriations process would further insulate the FDC from political pressures.

### Advantages

The FDC has many advantages over the current approach.

- 1) Exemption from restrictive acquisition regulations. Private investment transactions take far less time than government decisions.
- 2) Exemption from civil-service rules, allowing competitive compensation packages to attract a highly-skilled, motivated staff.
- 3) More focused and efficient than tax incentives and similar policies.
- 4) Potentially lower cost. The FDC would not only leverage government funds by attracting private sources of funding, but it also would give the government a return on its investment.
- 5) The private sector, rather than the government, would choose the technologies and companies which are most commercially viable. This market mechanism should improve the potential for success of funded projects.

*For more information, contact Erik R. Pages or Alisa M. Federico  
of the BENS Defense Transitions Project at (202) 296-2125.*



# MEDIA ADVISORY

## Business Executives For National Security

For Immediate Release

November 19, 1993

### Business Group Calls for New Approach to Defense Conversion

A study released today by Business Executives for National Security (BENS) says that the defense conversion programs embraced by the Clinton Administration and Congress do not go far enough in assisting U.S. defense firms. The study notes that sufficient working capital is not available to companies struggling to succeed in non-defense markets. According to BENS, existing efforts to fund dual-use research are too limited and are unlikely to yield significant commercial advances. BENS, a national organization of business leaders, is calling for the government to help expand financing options for defense firms trying to succeed in the commercial marketplace.

"When it comes to defense conversion, the Clinton Administration only has it half-right," noted Erik R. Pages, the report's author. "They have done an excellent job in supporting dual-use research. But all this effort will be wasted if the research isn't turned into products that help build new companies and create new jobs. Right now, there simply isn't enough working capital to move good ideas from the lab into the marketplace," said Pages, Director of the BENS Defense Transitions Project.

The report describes the intense "credit crunch" that has impacted new companies across the country and hit defense companies especially hard. To cope with this problem, the report recommends creating a number of new programs to help increase financing sources for small and medium-sized defense firms, including a new Business Development Program, and an expanded commitment to export promotion.

In addition, the report calls for government support of a Fund for Defense Conversion. The Fund would provide public and private support for venture capitalists and investment bankers to fund promising defense conversion projects. "The Fund for Defense Conversion represents a new way of doing business," said Pages. "Past government financing efforts have been marred by pork-barrel politics. By having private investors make financing decisions, we can ensure that the market, not politics, drives the conversion process. If we don't link conversion programs to market needs, this entire effort is doomed to failure."

For more information, or a copy of the report, contact Erik R. Pages at (202) 296-2125.

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*BENS is a national, non-partisan association of business leaders working to improve national security by promoting better management of defense dollars, advocating measures to make the economy stronger and more competitive, and finding practical ways to prevent the use of weapons of mass destruction.*

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# NEXT STEPS IN BUSINESS CONVERSION:

SUPPORTING INNOVATION AND  
ENTREPRENEURSHIP

*By Erik R. Pages*

*Director  
BENS Defense Transitions Project*

*November 1993*

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Special  
Report



BENS is a national, non-partisan association of business leaders working to improve national security by promoting better management of defense dollars, advocating measures to make the economy stronger and more competitive, and finding practical ways to prevent the use of weapons of mass destruction.

The Defense Transitions Project, a self-contained unit of BENS, promotes research and public education into the ongoing process of defense conversion. The Project's staff regularly advises federal, state, and local governments as well as business communities on effective responses to the defense transition challenge.

For further information contact  
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Business Executives for National Security

**NEXT STEPS IN BUSINESS CONVERSION:  
SUPPORTING INNOVATION AND ENTREPRENEURSHIP**

by  
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Director  
BENS Defense Transitions Project

November 1993

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## NEXT STEPS IN BUSINESS CONVERSION: SUPPORTING INNOVATION AND ENTREPRENEURSHIP

### Executive Summary

Existing federal programs have made important strides in assisting defense firms seeking to diversify into civilian markets. Yet, by limiting support to funding of dual-use research and development, these initiatives do not offer remedies to the credit crunch that has severely impacted small and medium-sized defense firms. The Clinton Administration and the Congress should examine several new initiatives that will improve access to capital and provide other needed services to these companies. Several new initiatives will help strengthen existing programs:

- A Business Development Program that supports small business incubators and provides hands-on marketing and business planning assistance.
- An expansion of existing export promotion activities with special emphasis on outreach to small and medium-sized businesses.
- The use of tax incentives to encourage partnerships between large and small defense firms.
- Creation of a Fund for Defense Conversion to enhance the availability of working capital for small and medium-sized defense firms.

### Introduction

For many years, Washington resisted programs which encouraged defense companies to pursue business in civilian markets. The Clinton Administration initiated a welcome change in this legacy when it supported the creation of the Technology Reinvestment Project (TRP) and a number of other programs to support defense conversion. Missing from this laudable effort have been programs that assist defense firms and start-up ventures which require financing to commercialize defense technologies.

This study analyzes the causes of the credit crunch and its particularly severe effects on small defense and high-technology firms. It next describes existing federal programs, and points to several state and local business assistance programs that might offer models for new federal efforts. Finally, it offers a range of suggestions for enhancing small business' access to patient working capital.

### Background

With defense budgets in decline, U.S. businesses can no longer remain dependent on defense contracts for the bulk of their revenues. After many years of postponing change, American defense contractors have begun to respond to these wrenching dislocations. Businesses across the country are now turning their attention to defense conversion and searching for ways to succeed in commercial markets.

These moves into commercial sectors make good business sense. Simply put, there are too many defense firms chasing too few defense dollars. Since FY1985—the height of the Reagan defense buildup—the U.S. defense budget has been reduced by 32% and will decline an additional 25% by FY1997. Procurement accounts have been reduced even more rapidly. Since 1990, procurement spending has declined by roughly 15% every year. Since 1985, the total procurement budget has been cut by 64%.<sup>1</sup> In contrast to defense spending declines after the Korean and Vietnam conflicts, today's downturn is not cyclical. With few major security threats on the horizon, the short-term trend for defense spending is a continuing steady decline.

Past business diversification efforts have achieved mixed levels of success. Contrary to the claims of Martin Marietta Chairman Norman Augustine and other defense industry executives who claim that "the record of conversion is unblemished by success," some defense firms have succeeded in entering commercial markets.<sup>2</sup> But making the transition is difficult. In fact, entering new markets has proved difficult for both military and commercial firms.<sup>3</sup>

The spreading impact of defense cuts led to a growing interest in government programs to ease the transition from defense to commercial work. As is so often the case, state and local governments have taken the lead.<sup>4</sup> Yet, few of these initial efforts were designed to support defense businesses alone. In most instances, support for defense firms was included in economic development programs first created in the 1980s to help revitalize manufacturing in the Northeast and Midwest regions. The paradigms for these programs are Pennsylvania's Ben Franklin Technology Partnerships and the variety of programs developed in Ohio which support technology transfer and business development activities.

Building on these models, state and local governments began creating a package of assistance programs for defense-dependent businesses that provided services such as retraining, marketing assistance, and small business loans. St. Louis' Economic Adjustment and Diversification Program is a national model for such efforts. Created in 1990 to help companies and workers respond to lay-offs at McDonnell Douglas and its subcontractors, the St. Louis program has proven quite effective in supporting new companies and retraining workers and management. The program provides entrepreneurial training to laid-off defense personnel, and, most importantly, personnel at risk of being laid-off. St. Louis also operates a small business incubator on space donated by McDonnell Douglas. This incubator has contributed to the establishment of several successful companies in the region.

## Current Federal Programs

While the states and localities continued these low-level efforts, Washington largely maintained a "hands-off" attitude toward promoting defense conversion. Indeed, the Federal government did little to develop expertise in defense conversion—the only agency responsible for this area was the Pentagon's Office of Economic Adjustment (OEA), which provides assistance to communities affected by military base closures.

As defense budgets declined, pressures to develop federal conversion programs intensified. Given Washington's limited expertise, the Congress was forced to create new programs to support industry diversification. Initial efforts began in 1991. In 1992, Congress passed the

Defense Conversion, Reinvestment, and Transition Assistance Act of 1992. Passed over the Bush Administration's objections, this bill created a series of new conversion programs and significantly increased funding for existing projects.

In contrast, the Clinton Administration embraced the Congress' efforts and created a comprehensive conversion program of its own. Announced in March 1993, it included new programs to assist workers and aid communities affected by the closure of military bases.<sup>5</sup> Also included was an innovative approach to supporting dual-use R&D—the Technology Reinvestment Project (TRP).<sup>6</sup>

The TRP contains eight programs created by Congress in 1992. For FY1993, the TRP was funded at approximately \$471 million; expected funding for FY1994 is \$575 million. The TRP is administered by an interagency group known as the Defense Technology Conversion Council (DTCC), which consists of the Departments of Defense, Commerce, Energy, Transportation, the National Science Foundation, and the National Aeronautics and Space Administration. Although the program is jointly administered, primary management responsibility rests with the Pentagon's Advanced Research Projects Agency (ARPA).

The TRP represents a revolution in U.S. defense industrial base policy. Unlike past defense R&D programs, the TRP aims to encourage research into commercial or dual-use products, i.e. items that can be utilized for both military and civilian purposes. For the first time, Washington has supported efforts by defense firms to diversify into new markets.

*The TRP represents a revolution in U.S. defense industrial base policy. For the first time, Washington has supported efforts by defense firms to diversify into new markets.*

While individual TRP programs differ, they share two characteristics. First, they encourage coordination and collaboration between business, government, academia, and non-profit groups. Second, nearly all of the programs require matching funds from the private sector. In most cases, award recipients must provide at least 51% of a project's funds. Sematech and other federally-sponsored consortia require similar cost-sharing criteria.

In addition to being innovative, the TRP has also been popular. Initial regional briefings were heavily attended, prompting many observers to raise fears that TRP managers would be swamped with applications. In late July, the TRP received roughly 2, 800 applications,

requesting a staggering total of more than \$9 billion in grants. On October 22, 1993, the President announced the first round of TRP selections, funding 41 projects involving 272

industrial and other organizations.

While most observers acknowledge that the TRP is well-intentioned and well-managed, it does not address many critical components of the conversion puzzle. First, insufficient funding lessens the program's potential impact, as nearly \$7.5 billion worth of proposals will likely go unfunded. However, given the current budget climate in Washington, one should not expect major increases in funding levels over the near term.

Second, as currently structured, small and medium-sized firms—the purported focus of the TRP—have faced difficulties in competing for support. Stiff competition has played some role in dissuading smaller businesses from competing, but the most important factor



has been the TRP's requirements for matching funds. Already buffeted by an economy-wide credit crunch, small businesses have faced great difficulties in obtaining funds to meet the TRP's matching requirements. The FY1994 Defense Authorization bill urges the Administration to offer more flexible matching arrangements for smaller firms.

Third, the bulk of TRP funding (approximately \$262 million) focuses on technology development. Generally speaking, technology development funds provide R&D support and are managed in a manner similar to other ARPA projects. Primarily, this means providing seed money to cultivate new dual-use technologies or configure military technologies for commercial needs.

However, few small and medium-sized firms need more R&D funding, a fact borne out by state-level surveys from across the nation.<sup>7</sup> The results of these surveys are nearly unanimous and were further confirmed in interviews conducted for this study. Above all else, contractors expressed interest in government assistance with marketing, financing and export promotion. The TRP supplies none of these services.

Finally, the TRP focuses almost exclusively on aiding existing firms. While this focus is unavoidable, it neglects an important part of the conversion equation: assisting start-up firms and new entrepreneurs leaving the defense sector.

Politicians and analysts frequently note that some of America's most advanced technologies and skilled personnel are utilized in defense

production. What they fail to note is that these resources may offer the potential to

create the 21st century successors to Silicon Valley and Massachusetts' Route 128 corridor. Washington must do more to support small business incubators and other programs that spur entrepreneurship.

## Different Conversion Strategies

The TRP's lack of support for smaller entrepreneurial firms points to a fundamental weakness in many conversion programs across the country. Few of these projects recognize the potential for two separate types of conversion strategies.<sup>8</sup> Internal conversion refers to efforts by defense companies to transform themselves to compete in commercial markets. It involves the transition of the business' existing workforce, equipment, and facilities. In contrast, external conversion refers to the broader economy-wide transition of workers, technologies, and facilities released by military-oriented firms to re-employment in the civilian sector.

Because many defense firms are poorly equipped for the civilian marketplace, internal conversion is quite difficult to achieve. Defense firms have a corporate culture unlike that of their commercial counterparts. Because they traditionally sell to one customer—the U.S. Government—they lack commercial marketing skills and expertise. Moreover, military customers often demand products manufactured in small numbers that meet stringent technical standards. In many cases, this requires hand-tooling rather than the automated production that characterizes

*While most observers acknowledge that the TRP is well-intentioned and well-managed, it does not address many critical components of the conversion puzzle.*

non-defense manufacturing. All of these distinctions have produced a unique corporate culture which complicates defense diversification efforts.

While difficult, internal conversion is not impossible. Small and medium-sized businesses have been most successful in entering commercial markets. These companies have capitalized on a number of special advantages that ease the path to diversification. In contrast to the larger prime contractors, small firms tend to lack large internal bureaucracies, making them more flexible to enter new markets. Moreover, many smaller firms already do business with both defense and commercial suppliers. Thus, they already understand the commercial marketplace. Finally, and most importantly, smaller companies tend to have a strong commitment to diversification. Larger contractors can downsize and maintain smaller but still significant market shares. For small firms, downsizing often means closure. These pressures inevitably increase management's

commitment to conversion. BENS' research has found that management commitment to diversification is the most critical factor to success.<sup>9</sup> It does not guarantee success, but its absence does guarantee failure.

Successful firms have determined their core competencies, and sought to exploit these competencies in new markets.<sup>10</sup> For example, New Jersey's Base 10 Systems utilized its core skills in encryption technology to develop medical software that can be used to predict a person's proclivity to certain diseases.<sup>11</sup> Similarly, Camarillo, California-based California Amplifier has enjoyed a 3-year sales increase of over 300% by utilizing core skills in defense radar detection to

manufacture amplifiers for home satellite television dishes.<sup>12</sup>

As these examples indicate, internal conversion involves utilizing technologies previously developed for defense and "converting" them to civilian use. In effect, this is the classic "dual-use" strategy. This conversion strategy is the most common approach utilized by contractors; it is also the only strategy supported directly by federal conversion programs like the TRP.

Existing efforts to support internal conversion obscure the promise of a second approach: external conversion. Although external conversion is an economy-wide process, this study limits its focus to the possibility of utilizing defense technologies and skilled defense personnel

to develop new businesses and create additional growth opportunities in the future.

External conversion involves efforts to promote technological innovation and spur

entrepreneurship. It can take several forms, including the creation of new start-up companies and support for new firms that "spin-out" of larger defense firms and commercialize defense-related research.

Although state and local programs have made important contributions in this area, Washington has done little to support external conversion efforts. This is unfortunate, because this conversion strategy offers great promise. No matter how successful, internal conversion efforts rarely preserve every job previously devoted to defense production. Indeed, internal conversion must often be viewed as a stop-gap effort to maintain a viable company and retain as many jobs as possible. External conversion, in contrast,

*BENS' research has found that management commitment to diversification is the most critical factor to success. It does not guarantee success, but its absence does guarantee failure.*

offers the potential for job creation and productive re-employment of displaced defense workers, management, and capital resources.

In addition, support for external conversion can offer many benefits to the economy at large. Small, innovative firms have traditionally served as the drivers of technological advancement in the U.S. Defense firms and research facilities now undertake state-of-art research in a number of areas. Encouraging entrepreneurs to commercialize defense research could not only create new jobs but also help spur the nation's technological growth into the 21st century.

## Supporting Spin-Off: What is Needed?

Our interviews and previous research indicate that, in high technology sectors, the success of start-up or spin-off firms depends on three factors:

- Technology that meets market needs
- Effective management with market savvy
- Stable sources of capital

Cutting-edge technologies do not, by themselves, guarantee commercial success. Less exotic technologies are often easier to adapt to products with high market potential. For many firms in their infancy, it may make sense to

*Sources of capital have declined precipitously in recent years. This credit crunch has impacted all types of businesses, but it is especially severe on defense firms trying to enter commercial markets.*

postpone manufacturing and marketing products utilizing their most innovative technologies. Successful start-ups often focus on low-profile products that help generate cash-flow, which in turn helps fund development of other products.<sup>13</sup>

Determining a technology's market potential is an extremely complicated task. In fact, it might be best portrayed as an art rather than a science. This process is especially difficult for defense firms who traditionally market to only one customer—the U.S. Department of Defense.

It is here that market savvy comes into play. Market savvy seems to rely on equal measures of innate entrepreneurial sense and past professional experience. However, studies of successful start-up companies indicate that the latter may be more important. One recent study found that CEOs of high-growth start-ups averaged ten years experience in the industries in which they started their companies. In contrast, the majority of CEOs of no-growth or low-growth start-ups had no experience or had spent only a few years learning their industries from the inside.<sup>14</sup>

These data offer a sobering reminder to defense industry executives trying to create new commercial companies. Thus, in many cases, start-ups should stick close to home, developing dual-use technologies prior to developing purely commercial products.

Moreover, research also indicates that the most successful start-ups were founded by teams. As Inc. magazine put it: "If You Don't Have Experience Buy It." By linking with others, defense personnel can tap the expertise of managers with backgrounds in commercial markets.

Reliable sources of capital are the final ingredient for successful start-ups.

Although individual company demands for capital are often quite limited,<sup>15</sup> aggregate demand for start-up capital has remained intense in recent years. Unfortunately, sources of capital have declined precipitously in recent years. This credit crunch has impacted all types of businesses, but it is especially severe on defense firms trying to enter commercial markets. Banks have been reluctant to loan to contractors for several reasons. First, they remain skeptical about the prospects for defense conversion. This process is inherently high-risk, and discourages bank lending. Second, bankers often appear equally skeptical about the market savvy of defense industry managers. Finally, even when a defense firm shows some commercial success, they frequently have difficulty obtaining financing. This has been especially true in commercial aerospace, where bankers fear future market downturns. In some cases, defense firms have won commercial contracts, but were unable to secure financing.<sup>16</sup> Without financing in place, they have been forced to forego the contract.

This poses a real dilemma for smaller defense contractors. On the one hand, their old markets are slowly but surely disappearing. At the same time, even when they succeed in retooling, they cannot get financing to enter new markets. When working in the defense world, these firms survived on Pentagon progress payments. In the commercial world, progress payments do not exist. The company is paid after the contract is completed. Thus, the demand for working capital expands as companies shift more and more of their business into commercial markets.

While banks have grown unwilling to make loans, other sources of capital have also dried up. During the 1980s, private venture capitalists helped fund such industry giants as Sun Microsystems and Microsoft. Unfortunately, many of these

funding sources no longer exist as classic venture capital investment had almost disappeared by 1990. While American venture capital remains a vibrant industry, venture firms have begun to focus their attention on lower-risk, later-stage investments. Some figures developed by Venture Economics illustrate this change. Between 1987 and 1992, the value of venture capital investments in start-up companies declined by roughly 65%.<sup>17</sup> Thus, one of the primary engines of past economic growth has nearly disappeared at the time when patient start-up capital is in great demand. As a result, start-up companies have been unable to take ideas from the drawing board to the marketplace.

Most analysts agree on a menu for start-up success that includes stable financing, management skill, and innovative technology. Unfortunately, they also agree that many of these ingredients do not exist in the defense sector. Former defense personnel can rely on unique strengths in only one area—technology. American companies, and especially firms in the defense sector, enjoy access to technologies that are second to none. Their primary challenge is to commercialize this technology. This problem is not confined to defense firms. In general, American industry and research institutions have excelled at basic research, but have lagged behind foreign firms in their ability to turn this research into commercial products.<sup>18</sup>

Given the needs of defense firms and the inherent technological advantages they enjoy, one might expect government programs to focus on providing management training and improving access to capital. Ironically, government programs have instead focused on improving the technological base of defense firms through additional support for R&D. The major obstacles facing new companies have not been addressed.



## Supporting Spin-Off: A Workable Blueprint

If the Clinton Administration hopes to further promote defense conversion, it must reorient its priorities and tackle these other critical problems. Instead of continuing to fund dual-use research through traditional mechanisms, it must also begin to nurture a broader technological infrastructure that promotes innovation and entrepreneurship. An effective technological infrastructure includes traditional factors like transportation and communications facilities, but it also entails new factors such as technology talent, access to capital, and close cooperation between government and business. Supporting this infrastructure will not only promote defense conversion, it will also support efforts to promote technological development across the board.

These new initiatives do not require major infusions of new funding or the creation of new organizations. Fortunately, many outstanding models, such as the St. Louis project, already exist at the state and local level. These programs provide start-ups and small businesses with a wide range of services that can help ease the path to success. Washington should support and emulate these efforts.

Programs don't have to be driven and directed by government bureaucrats. Indeed, that approach is doomed to failure. If government efforts are to succeed, they must be based on existing market needs and demand. Government cannot not do this alone. However, it can play a useful role if conversion support programs are based on a cooperative relationship with the private sector.

These partnerships can take many forms. Some have been created by state governments. Pennsylvania has been a leader in national efforts to promote entrepreneurship through its nine technology transfer and industrial extension projects. Philadelphia's Ben Franklin Technology Center of Southeastern Pennsylvania has been particularly effective, providing seed capital for two-thirds of the 25 leading growth-oriented companies in the Philadelphia area.<sup>19</sup> The Center is funded through a combination of state funding, grants, and in-kind contributions from supported business and provides a range of services for start-up firms. These include support in licensing new technologies, a start-up capital fund for new entrepreneurs, and range of databases that provide vital information to businesses.

Universities, often in cooperation with government, have also created effective programs to support new business development. Using its state of the art facilities and high-quality faculty, the Massachusetts Institute of Technology has been a national leader in supporting entrepreneurial firms. MIT's technology transfer efforts have helped create more than sixty companies since 1984. In addition, MIT continues to negotiate approximately eighty new licenses for technology each year.<sup>20</sup>

The MIT effort works primarily through the transfer of technologies first developed by university researchers. Other universities have established more "hands-on" business development programs. For example, the University of Texas-Arlington provides effective manufacturing extension services through its Automation and Robotics Research Institute (ARRI). ARRI has played an important role in supporting several defense spin-off companies in the Dallas-Fort Worth area. Similarly, the University of Colorado at Colorado Springs has recently created an ambitious program to

support new business utilizing defense technologies from area firms

Public-private partnerships are not the only possible model. In a number of cases, companies themselves have created effective programs on their own. Grumman Corporation has recently created a Corporate Licensing Office as well as Grumman Ventures, a venture capital subsidiary that makes equity investments in emerging technologies. The Licensing Office licenses patents, copyrights, and know-how which Grumman does not seek to commercialize. Grumman Ventures invests in firms with innovative technologies with the potential for a strategic fit with existing Grumman initiatives. Both of these programs present an excellent model for spurring the development of technologies in entrepreneurial start-up firms.

The Microelectronics and Computer Technology Corporation (MCC) recently created its own venture capital arm—MCC Ventures, Inc.—in 1992. MCC Ventures provides a wide range of support, including financial and management assistance, international bench marking, and commercial market development. MCC has already succeeded in supporting several start-ups and recently won a contract to support start-up companies commercializing research from Los Alamos National Laboratories.

*Successful programs traditionally provide "one-stop shopping" for business development. In this sense, the programs are user-friendly.*

industrial sectors. Yet, despite their differences, successful programs convince several shared characteristics that are critical to success. Five factors have been especially important:

- Provide hands-on help.
- Provide a wide range of services.
- Focus on market development.
- Offer management training.
- Focus on affordable technology.

Existing programs are normally small and underfunded. For this reason, they have generally been unable to provide businesses with state of the art facilities or technologies. They have instead emphasized providing more mundane, but essential, services such as marketing surveys, business planning

advice, and entrepreneurial training.

These efforts are driven by two primary thrusts: improving the quality of management and ensuring that a firm's market goals are realistic and achievable. In addition, successful programs traditionally provide "one-stop shopping" for business development. In this sense, the programs are user-friendly. To its credit, the Clinton Administration has recognized the importance of improving existing services in many of its own conversion programs.

## Keys to Success

Existing efforts provide a variety of services, maintain different organizational structures, and support different types of companies and

## How Can Washington Help?

Based on the lessons from these successful regional, state, and local initiatives, the Clinton Administration should institute several

changes to its conversion initiatives. First, it should expand support for small business incubator and management training services. These programs, such as the Ben Franklin Centers and Connecticut's Seatech Center, work well because they offer an array of hands-on services under one roof. Although the services provided by these centers vary considerably, they typically include financing, provision of office space, legal guidance, bookkeeping assistance, networking opportunities with other firms, and export assistance.

Some of these services can be provided through the seven manufacturing extension centers now managed by the National Institute of Standards and Technology (NIST). President Clinton plans to increase the number of these centers to 35. In addition, the NIST Centers will enjoy a 66% boost in their budgets for FY1994.

While the NIST centers can offer useful assistance in supporting manufacturing improvements, they cannot offer many of the hands-on services provided by state and local business assistance centers. Nor should we expect the NIST centers to offer this service; they are appropriately limiting their efforts to supporting technology transfer and manufacturing improvements.

While some states, such as Connecticut and New York, have set up effective business development programs, others have lagged behind. And few states offer programs targeted to the special needs of defense contractors. Unfortunately, many areas of greatest need, such as Southern California, lack well-funded programs to help develop new businesses. To help other states emulate the example of effective state programs, the Clinton Administration should consider creating a new program category under the TRP: the Business Development Program.

The Business Development Program would work in a similar manner as the TRP's other technology deployment programs. Universities, regional bodies, and state and local governments would be eligible to apply for federal funding to support the creation of new business development centers or expansion of existing programs to support the diversification of small businesses and the development of new start-up firms. As with other TRP programs, Business Development funds would be competitively awarded and based on a fifty percent cost sharing by the applicant.

Second, the Administration must continue to expand its export promotion activities. The President's National Export Strategy, announced on September 29, 1993, takes a step in the right direction by eliminating outdated export controls and expanding Washington's export promotion activities. Companies will face many fewer obstacles in obtaining government assistance, as the new strategy is based on "one-stop shopping" for export promotion aid. Finally, and most importantly, the Commerce Department will begin shifting funds to provide greater support for manufacturing exports. Until quite recently, nearly 80% of U.S. export promotion funds supported agriculture, which accounted for only 10% of all U.S. exports.<sup>21</sup>

One of the more promising components of the President's plan is the proposed creation of at least four export assistance offices outside of Washington, which will focus on supporting smaller exporters. However, budget constraints are likely to restrict the expansion of this program. For this reason, the Administration must also continue to support state and local export promotion activities. In addition to being more numerous, these programs are also likely to be more effective. Many smaller companies seek assistance in market development at home before pursuing

export opportunities. Business development centers can provide an effective bridge between market development at home and the promotion of sales overseas.

Third, the Administration should examine the use of tax incentives to encourage private initiatives which spur entrepreneurship. As noted above, Grumman, TRW, and other prime defense contractors have established divisions which transfer technology or intellectual property to start-up "spin-out" enterprises. In other cases, contractors have provided space or equipment to these enterprises. For example, Lockheed has donated plant space to CALSTART, an innovative Los Angeles-based consortium developing advanced transportation systems and technologies. Tax credits could facilitate a major expansion of these beneficial activities.

Finally, the Administration must take action to enhance the availability of capital for defense diversification projects. Lack of financing has been an impediment to defense firms as they seek to enter commercial markets. As we saw earlier, this financing dilemma has a variety of causes, including an economy-wide credit crunch, declines in venture capital support for start-ups, and investors' general pessimism regarding the prospects for defense conversion. Faced with these obstacles, some observers have suggested that Washington provide direct financing for conversion projects. Another proposal recently considered by Congress called for creation of a small business loan program administered under the TRP. The FY1994 Defense Authorization bill also includes limited funding for small-business loans.

These well-intentioned efforts are unlikely to be effective. With respect to the notion of a TRP loan guarantee program, ARPA's lack of experience in this area is particularly worrisome. ARPA has proven uncommonly effective in

supporting innovative R&D; it has no proven track record in making loans to businesses. In general, Washington has a poor record in targeting investments to individual companies.

A far more effective approach would be to create a privately-run Fund for Defense Conversion (FDC), which would "privatize" parts of the TRP. The FDC would be organized as a coalition of venture capital outfits with the U.S. government as the initial investor. The FDC would extend capital on favorable terms--through low-interest, long-term loans or loan guarantees--to private firms seeking to convert all or part of their defense activity to non-defense applications. Private firms would be responsible for determining the potential activities to be funded, initiating the application, and, if it is approved, investing their own stake (for example, one-third of the total cost) and implementing the project.

The FDC should not be administered by a single centralized institution based in Washington. Financing will work more effectively if the process is decentralized. The best approach entails competition by private venture capital outfits, public-private partnerships and other institutions. Winners of this competition would then be authorized to provide federally-guaranteed loans to worthy conversion projects.

Shifting this responsibility to the private sector offers many benefits. The limited availability of public funds makes it imperative that those monies are spent wisely. Washington's expertise does not extend into the realm of deciding which firms can succeed. At the same time, political factors introduce uncertainty into the appropriations process, and often result in the maintenance of projects after they have outlived their utility. Given these realities, government agencies cannot micro-manage the financing process.

Such decisions are best left to private sector entities.

Models for this type of activity already exist. There are a number of venture capital firms that have taken an active role in financing conversion initiatives by small defense contractors or divisions of major contractors. These firms could serve as models for groups seeking to invest FDC funds. Since the Corporation represents a major shift in policy, the Administration might first consider the FDC as a pilot project or a component of existing programs, such as those operated by the Small Business Administration. Based on the FDC's early performance, they could then revisit the program and consider its expansion.

## Conclusions

Existing business conversion programs at all levels of government represent a sea change from the "hands-off" attitudes of the past. Yet, these programs offer only a partial solution at best. By neglecting a key part of the conversion puzzle—financing—current programs help spur commercial R&D but do not provide support for bringing these innovations to market. Without such financing in place, business conversion is doomed to failure.

Fortunately, the creation of financing mechanisms does not require massive funding or new government bureaucracies. By leveraging private funds and utilizing existing financing institutions, we can create new forms of public-private partnerships that create new jobs and new companies. Such new partnerships will allow us to turn the defense conversion challenge into an unprecedented opportunity for economic prosperity.



<sup>1</sup> Sources; Steven Koziak, "Analysis of the FY1994 Defense Budget Request," Defense Budget Project, April 1993; U.S. Department of Defense, FY1994 Budget Request.

<sup>2</sup> See Erik R. Pages, *Weathering the Defense Transition: A Business-Based Approach to Conversion*, (Washington, D.C.: BENS, November 1992); National Commission for Economic Conversion and Disarmament, *Successful Conversion Experiences*, (Washington, D.C.: ECD, May 1992); Center for Economic Conversion, *Converting the Cold War Economy: Sixty-three Companies Change for the Future*, (Mountain View, CA: CEC, 1992).

<sup>3</sup> Studies of efforts by commercial firms entering new markets found that only 20% of diversifying firms survived for more than ten years. See T. Dunne, et al., "Patterns of Firm Entry and Exit in U.S. Manufacturing Industries," *Rand Journal of Economics*, Winter 1988.

<sup>4</sup> For example, see Robert D. Atkinson, "Innovation Policy Making in a Federalist System: Lessons from the States for Federal Innovation Policy Making," *Research Policy*, Vol. 20(1991), pp. 559-577; David Osborne, *State Technology Programs: A Preliminary Analysis of Lessons Learned*, (Washington, DC: Council of State Policy and Planning Agencies, 1989).

<sup>5</sup> For background, see Erik R. Pages, *Recent Conversion Proposals: A BENS Assessment*, (Washington, DC: BENS, April 1993); Carol A. Lessure, *President Clinton's Defense Reinvestment and Transition Programs*, (Washington, DC: Defense Budget Project, March 1993).

<sup>6</sup> U.S. Congressional Budget Office, *The Technology Reinvestment Project: Integrating Military and Civilian Industries*, (Washington, DC: CBO, July 1993).

<sup>7</sup> For example, see Machine Action Project, *The Demise of the Massachusetts Defense Connection*, Paper prepared for the Massachusetts Industrial Services Program, March 1993; *Interim Report to the Governor of Virginia*, Governor's Commission on Defense Conversion and Economic Adjustment, July 1993; *Defense Transition: Economic Promise for Texas*, A Report from the Governor's Task Force on Economic Transition, February 1993; *Diversification: Strategies for Military-Dependent Communities, Firms, and Workers in Washington State*, Washington Department of Community Development, 1991.

<sup>8</sup> I am indebted to Dr. Lloyd J. Dumas of the University of Texas for this distinction.

<sup>9</sup> See Pages, *Weathering the Defense Transition*.

<sup>10</sup> Empirical research validates this strategy. See David P. Leech, "Conversion, Integration, and Foreign Dependency: Prelude to a New U.S. Economic Security Strategy," Draft, The Analytical Sciences Corporation (TASC), May 1993.

<sup>11</sup> Anthony Gnonfo, Jr., "A New Battle Strategy for Defense Contractor," *The Philadelphia Inquirer*, March 8, 1993, p. D1.

<sup>12</sup> Alan C. Miller, "Ex-Defense Company Thrives amid Military Cutbacks," *The Los Angeles Times*, April 1, 1993.

<sup>13</sup> See Amar Bhide, "Bootstrap Finance: The Art of Start-Ups," *Harvard Business Review*, November-December 1992, pp. 109-117.

<sup>14</sup> Leslie Brokaw, "The Truth About Start-Ups," *Inc. Magazine*, March 1993, pp. 56-64.

<sup>15</sup> For example, in 1987, the Census Bureau found that 30% of all companies were started with less than \$5,000. Even high-technology firms require relatively small capital infusions. A recent study of 110 MIT high technology spin-offs found that 97% were financed with less than \$250,000; 84% were financed with less than \$100,000 in seed money. See Brokaw, pp. 60-61; Statement of Jeffrey A. Timmons, Harvard Business School, in U.S. Congress, Committee on Science, Space and Technology, *Technology Policy and Competitiveness Legislation: Overview and Financing*, 103rd Congress, 1st Session, February 3, 16, 1993, p. 84.

<sup>16</sup> Peter Marks, "Hard-Hit Military Contractors Plead for Loans," *The New York Times*, June 4, 1993, p. B3.

<sup>17</sup> Figures calculated from annual data from Venture Economics.

<sup>18</sup> See, for example, David C. Mowery and Nathan Rosenberg, "The US National Innovation System," in Richard R. Nelson (ed.), *National Innovation Systems*. New York: Oxford University Press, 1993.

<sup>19</sup> Author interviews. Annual Reports from the Ben Franklin Technology Center of Southeastern Pennsylvania.

<sup>20</sup> Testimony of John Preston, Director of Technology Development, MIT, before the Energy Subcommittee of the House Space, Science, and Technology Committee, March 23, 1993.

<sup>21</sup> Keith Bradsher, "Administration Plans New Export Initiative," *The New York Times*, September 28, 1993, pp. D1-D2.

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Program Director**

**Corporation  
for  
Enterprise Development**

**for the**

**Subcommittee on Economic Growth  
and  
Credit Formation**

**House Banking, Finance and Urban  
Affairs Committee**

**U.S. House of Representatives**

**October 26, 1993**

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Mr. Chairman, and Members of the Committee, thank you for inviting the Corporation for Enterprise Development here today to share our thoughts and experiences on the credit needs of emerging entrepreneurs and high-technology small businesses. I would like to begin by describing the background and perspectives that both the Corporation for Enterprise Development and I bring to this issue to provide a context for my remarks. I will then offer a series of guiding principles for the design of development finance institutions which directly address the questions posed by the Subcommittee for discussion at this hearing.

The Corporation for Enterprise Development (CFED) is a private, nonprofit organization whose mission is to promote economic competitiveness and opportunity for all, but particularly for low-income people and communities. We focus on the design of policy and practice in the areas of economic development, human investment and governance. Our experience with high technology entrepreneurs and their businesses arises out of our work in the economic competitiveness, which is driven by our annual publication of the Development Report Card for the States. The Development Report Card presents over fifty economic indicators on every state for a five year period which are organized to provide benchmarks in three key areas: economic performance; business vitality; and development capacity. The business vitality index looks explicitly at the health of each state's business base in terms of competitiveness, entrepreneurial capacity and structural diversity. The development capacity index measures each state's capacity for future growth in terms of human, financial, and technological resources. In 1993, CFED added a special update to the Report Card, at the request of our readers, of two and five-year trends in technology resources to reveal which states were improving in this key determinant of economic success.

CFED's experience with technology-related programs through The Development Report Card has been complemented by the delivery of direct services to cities and states in the design, implementation and evaluation of financial and technical assistance programs for technology-based businesses. CFED had a primary role in introducing the phenomenon of flexible manufacturing networks to U.S. policymakers as a powerful tool for moving business culture and practice to the global norm. We have worked at the state level to create a foundation of policy that can support politically viable programs to promote manufacturing modernization and technological innovation by identifying best practices in the field. To this organizational capacity, I bring nine years working directly with small businesses to structure public and private financing which will enable these companies to grow in a financially healthy manner. For the last five years, I conducted a national program to train small business owners in finance, on the realization that most business owners go into business because they love to do what their businesses do, not because they enjoy, or even understand, finance. However, if their businesses are to survive, they must learn the basic principles of financial management.



It is on the basis of all this collective experience that CFED offers the following guiding principles for the design of development finance institutions:

- *While the capital markets operate on an international basis, many of the capital gaps facing small businesses are local in nature.*

State and local economic development professionals have cited the geographic inequities in the availability of venture capital for start-up businesses for almost a decade. CFED had conducted numerous audits of banking practices throughout the country which identifies key differences in lending patterns to small businesses on both a state and regional basis. The Development Report Card identifies major disparities in the resources available at the state level to assist small and technology-related businesses. Economic development professionals who structure financing for small businesses using federal economic development financing tools know the wide discretion exercised by state and local offices of the federal agencies in the interpretation of program policies, and the impact of this discretion in expanding or constraining the capital available to small businesses.

This reality speaks to the need for any new development finance program targeted to emerging entrepreneurs and high-technology small businesses to be flexible enough in its implementation so that it can fill the specific capital gaps experienced by these businesses in a particular state or region. The delivery of financing should be organized on the local level with the federal government developing standards based on specific policy goals to guide the allocation of funding and the evaluation of the performance of the local financial institutions.

- *Addressing the credit needs of emerging entrepreneurs and high-technology small businesses cannot be separated from the need to enhance entrepreneurial capacity.*

Financing programs to this market will not succeed if they offer financing assistance alone; we have learned this lesson from sources as diverse as venture capitalists and microenterprise practitioners. Effective and financially viable programs must combine high quality, customized and long-term technical assistance services before, during and after the financing process. The federal government should provide incentives for the creation of partnerships between the state programs which promote technology transfer and provide manufacturing modernization services and any new financing entity so we can build on the existing capacity that already exists in the field. However, in states where this capacity does not exist (and there are many, given the unevenness of development capacity in this country), there needs to be adequate funding for the provision of technical assistance.

- *Efforts to coordinate or consolidate the delivery of federal programs for high-technology businesses and entrepreneurs must be paralleled by efforts to create integrated service delivery systems at the local level.*

An entrepreneur's point of entry into the vast economic development financing system is almost always through a local economic development professional or organization. Unfortunately, the local economic development delivery system is often as fragmented and confusing as the system that exists at the federal level. CFED recently completed a nine month study for the Pennsylvania Department of Commerce of the local delivery system for economic development services which was commissioned out of an awareness by the Department that their ability to provide quality services to Pennsylvania companies was directly dependent on the quality of the services provided at the local level. A significant factor in the fragmentation of services at the local level is the lack of coordination of economic development financing programs at the federal level; when an agency designs a new program, it often creates a new delivery mechanism at the local level, rather than identifying existing economic development organizations which could expand their functions to fulfill new roles.

Thus, while it is essential that the federal government seeks to coordinate the missions, administration and delivery of all its programs which serve high-technology companies, it should use the opportunity to also encourage the rationalization of local service delivery. It is only through this coordinated approach that we can begin to develop the type of customer-driven economic development delivery system that will yield the greatest benefits and efficiencies in promoting economic competitiveness.

- *There is a fundamental contradiction in the idea of the federal government having a true equity stake in a privately held company.*

Venture and seed capitalists who invest in the early stages of a company's development are high risk investors with little, if any, traditional type of security or collateral backing their investments. They succeed by seeking high enough rates of return for their investments so that a few winners can balance out many losers. In the words of a well-known private venture capitalist: "The lemons always ripen before the peaches." The actual security for their investments is control, which means that the seed or venture capitalist is prepared to step in and manage a company if it is not meeting the investor's expectations. Herein lies the problem for the public sector if it chooses to make equity investments: no one, least of all the government, wants to see the public sector in a direct management role in a privately held company. All our experience over the past decade with publicly capitalized venture capital programs has underscored the truth of this lesson.

This does not mean that if the federal government provides high risk investment capital that it should not be compensated for bearing this level of risk. However, the

government should use financial instruments such as subordinated debt, financial participations or royalty financing which provide for upside return without the obligation to assume an ownership role in the venture.

- *New benchmarks for measuring success must be created to fairly evaluate the performance of a technology-driven program.*

The single measure used by almost all federal agencies in gauging the success of economic development financing programs is the number of jobs created through a specific investment. While this measure should be one of the standards used to evaluate the impact and efficiency of a program to finance technology businesses, it does not address the realities inherent in financing and assisting a technology and/or emerging business. In many cases, existing businesses which are modernizing to become globally competitive may actually lose jobs in the short-term as a means to survive into the long-term. Secondly, supporting an emerging technology business is a long-term process which may not show results in terms of jobs created for several years; in fact, hiring people too early may actually jeopardize the viability of the company, rather than be a sign of success.

Thus, the federal government must create new benchmarks which can track and evaluate other benefits of supporting high technology businesses which are consistent with the nature of the businesses and the types of services provided. Fortunately, there is ample experience to draw upon from states such as Pennsylvania, Ohio, Utah, or Oregon which have pioneered in the creation of benchmarks and performance standards in this area.

This completes my remarks for today. I would be happy to answer any questions. Thank you.



# N A S B I C

**Statement**

**of**

**Peter F. McNeish**

**National Association  
of  
Small Business Investment Companies**

**before the**

**Subcommittee on Economic Growth and Credit Formation  
Committee on Banking, Finance and Urban Affairs  
United States House of Representatives**

**October 26, 1993**

**NATIONAL ASSOCIATION OF SMALL BUSINESS INVESTMENT COMPANIES**  
1199 N. Fairfax Street • Suite 200 • Alexandria, VA 22314 • Tel: (703) 683-1601 • FAX: (703) 683-1605

**Mr. Chairman and Members of the Subcommittee:**

I am Peter McNeish, and I am the President of the National Association of Small Business Investment Companies, which is the national trade association for the SBIC industry.

I appreciate the opportunity to testify today on the issue of small high-technology companies' access to capital and the important role SBICs play in that market.

In the interest of time, a text of my complete statement has been submitted for the record, and I will cover only the major points in my verbal testimony.

**Summary**

I'd like to cover four major points today:

1. SBICs have made significant investments in new technologies, and they have the experience to select and fund high-technology companies that will create the critically important products of the future.
2. SBICs have been highly successful at creating jobs.
3. SBIC investments have generated substantial new tax revenues.
4. The newly re-structured SBIC program will materially increase SBIC investments in technology.

**SBIC Investments in Technology**

The experience of our industry tells me that a significant majority of innovative breakthroughs in high-technology are developed by small



growth firms, not big business. These are the entrepreneurs who can move quickly to develop new products and exploit market niches far faster than large companies that are burdened by bureaucracy and layers of management.

The SBIC industry's track record in providing long-term patient capital for these innovative growth companies is impressive, even without special incentives to invest in high-tech industries. On average over the past five years, some 20% of all SBIC invested dollars and 23% of the number of SBIC investments have been in the categories defined by the federal government as "national critical technologies."

To emphasize this point, I've submitted supplemental items with my testimony.

The first, which provides a good example of one SBIC's high-technology portfolio, is a letter from Norwest Venture Partners, an SBIC located in Minneapolis, MN which was submitted for a Senate hearing earlier this year. As the letter points out, over two-thirds of their SBIC's investments over the past 30-years have been in high-technology industries, and their investments were crucial to the survival and development of those companies. His letter describes eight (8) specific investments their SBIC has made in outstanding technology-based small businesses in such fields as biotechnology, nuclear waste, technological medical products, satellite rockets and computers. As the facts indicate, these investments have produced enormous benefits to the economy in terms of both technological advances and employment.

The second is a short-list of some 15 high-tech companies in which SBICs have made investments that have become star performers in their fields. These companies are engaged in a series of different technologies such as fiber optics, integrated circuits, biotechnology, satellite transmissions and super computers. And, they include such leading companies as Intel Corp., Compaq Computer Corp., Symbol Technologies, Inc., Orbital Sciences Corp. and Apple Computer.

The third item is a list drawn from a compilation of investments made by a small group of SBICs that we put together in 1991 for totally different reasons. This listing includes SBIC investments in 65 small companies engaged in a wide spectrum of advanced technologies, and should provide the Committee with a feel for the broad scope and diversity of technology investments that SBICs make.

In summary, these materials will give the Committee solid evidence that SBICs have been substantial players in making investments in high risk technology ventures.

### **Job creation**

SBIC investments in small growth companies have also been a major factor in the job creation process, and many of these new jobs have been created in high-technology industries.

Over the past three decades SBICs have invested \$9.1 billion in over 83,300 small businesses, and we have recently completed a study of the job creation impact of these investments.

The findings are quite striking. In summary, SBIC investments have produced an outstanding record of cost-efficient job creation:

- One new job is created for every SBIC investment of \$17,000.
- The government's portion of that investment is \$6,500.
- The government's actual cost to create a new job, based on the historical subsidy rate for the SBIC program, is only \$875.

I have enclosed a copy of our study on job creation for the record.

### New Tax Revenues

SBIC investments have also produced substantial new tax revenues for the federal government. While we do not have a tally of the total new tax income produced by the program, we have assembled data that more than tells the story.

I have enclosed for the record a compilation of information on twenty-five (25) of the leading SBIC investments. As this listing indicates, these companies alone have produced over \$4.0 billion in new tax revenues for the federal government. This amount of federal income far exceeds all of the losses the program has incurred over its thirty-five year history.

Clearly, the SBIC program has been a win-win investment for the government.

### The Newly Re-Structured SBIC Program

Finally, Mr. Chairman, I would like to mention the major improvements to the SBIC program achieved through legislation enacted by Congress last year. The Small Business Equity Enhancement Act of 1992 made significant changes to re-structure and improve the SBIC program.

I won't go into the details of those changes, except to say that the new SBIC program is now a much more attractive vehicle for venture investing and will automatically encourage greater investment in early-stage high-technology companies.

With the regulations governing this exciting new program nearly complete, literally hundreds of highly qualified groups are considering the formation of new SBICs and numerous institutional and other private investors are poised to invest hundreds of millions of dollars into the program. Based on the evidence of interest in the program, our projections are that some 200 new SBICs could be licensed over the next two years, with an average private capital of \$10 million. That would mean some \$2.0 billion of new private capital could flow into the program. When you add in SBA

guaranteed leverage, we're talking about a renewed SBIC industry with gross assets available for investment in small business in the range of \$4.0 billion.

The re-structured SBIC program will be a very important source of long-term capital for small, emerging technology companies. The program has been redesigned to provide exactly the kind of capital technology companies need - patient capital in the form of equity investments.

The new program will re-direct patient capital to start-ups and companies developing new technologies. When this development is coupled with the pending increase in the size standard for qualified SBIC investments, the new program should significantly increase the overall percentage of SBIC investments in a variety of technology-based industries.

### **Conclusion**

Thank you for the opportunity to testify today.

I will be pleased to answer any questions the Subcommittee may have.

NORWEST VENTURE CAPITAL

Norwest Venture Capital Management, Inc.  
2800 Piper Jaffray Tower  
222 South Ninth Street  
Minneapolis, Minnesota 55402-3388  
Bus: 612/657-1650  
Fax: 612/657-1660

June 7, 1993

Honorable Dale Bumpers, Chairman  
Committee on Small Business  
United States Senate  
SR-428A Russell Senate Office Building  
Washington, D. C. 20510-6350

Dear Senator Bumpers:

I am a partner of Norwest Venture Capital, one of the largest Small Business Investment Companies in the United States.

It has come to my attention that legislation is being considered by the Senate (S.4) that would establish a new government sponsored private investment program, administered by the Commerce Department, to help stimulate investment in high technology industries. The notion of an investment program to support high technology is laudable, since it is well understood that high technology businesses advance the productivity of the nation and provide high paying jobs to its employees. However, a new government program is not needed because it already has a high technology investment program, the Small Business Investment Company (SBIC) program under the Small Business Administration. The purpose of my comments to the Committee is to demonstrate that the SBIC program, through participants such as Norwest Venture Capital, has been effective in stimulating investment in high technology for over 30 years.

Norwest Venture Capital was founded in Minneapolis, MN in 1961 with \$2.0 million in capital as a new licensee in the SBIC program. Since then, Norwest has invested over \$300 million in over 250 businesses. Today it manages three SBICs and has offices in Boston, MA and Menlo Park, CA in addition to its headquarters in Minneapolis. The investment focus of Norwest over the years has been heavily weighted toward high technology businesses. Over two-thirds of our investment dollars have been invested in companies in the computer hardware, computer software, medical products and services, environmental, telecommunications and space exploration and other high technology industries. Most of these investments were at very early stages in the companies' histories and were crucial to the companies' survival and development. Several brief examples follow:

National Computer Systems, Minneapolis, MN. Initial investment in 1965. This company provides computer-based products used primarily in educational related applications. It had revenues in excess of \$300 million in 1992 and employs over 3,000 people.



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Cray Research, Inc., Minneapolis, MN. Initial investment in 1972. This company is a legend in the computer industry and is the dominant manufacturer of supercomputers in the world. With revenues of over \$797 million in 1992, Cray employs over 5,400 people.

Network Systems Corporation, Minneapolis, MN. Initial investment in 1974. NSC was a start-up company in 1974 developing computer networking products. The company had 1992 revenues of \$219 million and employs over 1,350 people.

MGI Pharma, Minneapolis, MN. Initial investment in 1980. Norwest financed the start-up of this biotechnology company founded by two scientists from the University of Minnesota. Today it is a successful publicly-held company.

Pacific Nuclear Systems, Inc., Seattle, WA. Initial investment 1983. This company provides products and services to ensure the proper handling of nuclear waste. Pacific Nuclear is publicly-held, had 1992 revenues of \$69 million, and employs 475 people.

Orbital Sciences Corporation, Vienna, VA. Initial investment in 1983. OSC produces special purpose rockets used in launching satellites and provides related services. It recognized very early the opportunities in the private sector for space exploration. Orbital is a publicly-held company with 1992 revenues of \$174 million and employs over 1,165 people.

Curative Technologies, Setauket, NY. Initial investment in 1986. The company's product is a topical dressing formed from a patient's own blood that can treat chronic, non-healing wounds. It is based on a technology from the University of Minnesota. Today CTI operates over 40 wound healing centers using its product. The company had revenues in 1992 of \$22 million and employs 197 people.

PeopleSoft, Inc., Walnut Creek, CA. Initial investment in 1990. This company provides sophisticated computer software that allows human resource departments to function much more efficiently. PeopleSoft had revenues in 1992 of \$31.5 million and employs approximately 188 people.

This should give you a sense of the types of technology-based businesses in which Norwest invests and some of the benefits to the economy and society from successful technology business development.

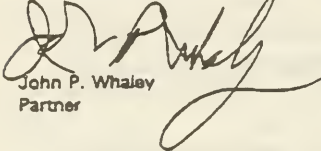
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You should also be aware that the Equity Enhancement Act of 1992 will strengthen the SBIC industry and in particular the new form of funding will make the program more conducive to early stage technology business investment.

It seems obvious to me that any additional measures to stimulate technology investment should be done within the SBIC program. Efforts to create a separate technology investment vehicle would be duplicative and counterproductive.

Respectfully yours,

NORWEST VENTURE CAPITAL



John P. Whaley  
Partner

JPW0001S

COMPANY Description	Number of Employees When SBIC Invested	1990	After Tax Profits (000s) When SBIC Invested	1990	Cum. Federal Taxes Paid (000s)
APPLE COMPUTER, INC. Manufactures microprocessor-based personal computer systems	63	14,500	42	454,033	1,232,010
ATLANTIC RESEARCH CORP. Produces computer and data analysis systems for population industries	870	4,100	359	20,000	30,000
BIOMAGNETIC TECHNOLOGIES, INC. Developer of medical instruments used to monitor magnetic fields within the human body	61	121	(466)	N/A	N/A
BIPOLAR INTEGRATED TECHNOLOGY Develops and manufactures high-speed bipolar computer chips	40	100	0	3,000	N/A
COMPAQ COMPUTER CORP. Manufactures portable and desktop IBM-compatible computers	155	9,700	(4,549)	430,000	588,600
COMPEK RESEARCH, INC. Provides computer systems and services and manufactures electronic components for defense-related industries	45	700	(53)	600	N/A
CRAY RESEARCH, INC. Manufactures supercomputers and mainframes	12	4,708	(3)	89,045	445,410
HUTCHINSON TECHNOLOGY, INC. Manufactures computer peripherals and supplies suspension assemblies for rigid disk drives	328	1,513	1,165	2,710	N/A
INTEL CORP. Leading manufacturer of integrated circuits	218	21,700	(1,888)	391,021	787,260
LANDMARK GRAPHICS, INC. Develops systems to interpret seismic data for energy related industries	16	500	(610)	5,833	8,072

COMPANY Description	Number of Employees		Alter Tax Profits (000's)		Cum. Federal Taxes Paid (000's)
	When SBIC Invested	1990	When SBIC Invested	1990	
MEASUREMENT SPECIALTIES, INC. Develops micro-chip technology for digital weight, temperature, pressure and distance measuring devices	22	98	(786)	2,500	N/A
NETWORK SYSTEMS CORP. Manufactures high-performance data communications products for computer networks	35	1,090	(638)	17,327	59,990
OPTICAL DATA SYSTEMS, INC. Develops fiber optic modems and multiplexers	2	60	0	2,129	N/A
ORBITAL SCIENCES CORP. Produces special purpose rockets used in launching satellites	20	1,165	N/A	N/A	N/A
PACIFIC NUCLEAR SYSTEMS, INC. Provides products and services to ensure the proper handling of nuclear waste	5	475	N/A	N/A	N/A
PHOTOMETRICS, LTD. Manufactures high resolution digital image processing systems	45	91	(52)	8,653	0
SYMBOL TECHNOLOGIES, INC. Designs and manufactures laser bar-code identification equipment	4	1,800	0	18,968	30,100
	1,941	62,421	(7,479)	1,445,819	3,181,442

### **Technology Company Investments by SBICs**

(Sample of Recent Investments)

**Advanced Polymer Systems, Inc.** — Develops and markets polymer-based delivery systems for the controlled release of active ingredients and therapeutic agents.

**Agripro Biosciences, Inc.** — Grain crop seed hybridization technology based upon induction of asexual male sterility.

**Alamo Technology, Inc.** — Electronics engineering specializing in aero space and weapon systems.

**Applied Extrusion Technologies, Inc.** — Manufacturer of specialty polyethylene and polypropylene products.

**Applied Intelligent Systems** — Designer and manufacturer of parallel processors for machine vision industry.

**Applied Spectrum Inc.** — Manufacturer and marketer of telephone security and data/voice multi-plexers and other telecommunications equipment.

**Astro Metallurgical** — Manufacturer of fabricated and wire products made of titanium and other specialty alloys.

**Automation Intelligence, Inc.** — Designs and manufactures computer-integrated manufacturing systems products, including applications of metal chipforming, numerical parts control software, and computer control systems.

**Benzing Technologies, Inc.** — Develops, manufactures and markets semiconductor processing equipment based on innovative applications of reactive ionized gas technology.

**Berkeley Quartz Labs** — Designs and manufactures quartzware for the semi-conductor industry.

**Biomune, Inc.** — Manufactures and markets biological vaccine products for the animal health and veterinary industry.

**Blueline, Inc.** — Develops, acquires, markets and licenses IBM and IBM compatible mainframe productivity enhancement software.

**Calera Recognition Systems** — Develops optical character recognition systems which scan, recognize, and process text in omni-font character recognition. Applications include building of CD-ROM databases, image management; and information archival and retrieval.

**Ceramic Research** — Manufactures new, state-of-the-art composite materials.

**CONFIDENTIAL** — Manufacturer of high quality specialty acrylics for medical, aerospace, and electronics applications.

**Credence Systems Corporation** — Manufacturer of application-specific integrated circuits, programmable logic devices, and micro controllers and chip sets.

**Data/Ware Development** — Produces test equipment and interfaces for input/output channels, and optical disk storage systems for IBM and IBM compatible mainframes.



**DET Holdings Corporation** — Manufacturer and marketer of equipment for producing compound semiconductor wafers.

**Dynaco Corporation** — Manufactures advanced, fine-line flexible printed circuits.

**Electronic Designs, Inc.** — Produces high-density, high-reliability Static Random Access Memory circuits.

**Emerging Technology, Inc.** — Developer and marketer of word processing software for microcomputers.

**Extrel Corporation** — Manufacturer and marketer of analytical mass spectrometers, which measure the chemical elements and compounds in substances, and specialized high performance magnetic and surface science instrumentation.

**Flightline Electronics** — Designer and manufacturer of instruments utilized in submarine detection, guidance and airborne testing systems.

**Gilead Sciences** — Designer and manufacturer of a new class of human therapeutics utilizing a technology known as "genetic code blockers" which block a disease at the DNA or RNA level. Gilead's development program is focused on drugs for cardio-vascular disease, viral infections and cancer.

**Hancock Software, Inc.** — Produces system utility software for VAX/VMS computers.

**Infortext Systems, Inc.** — Designs, manufactures and markets a line of microprocessor based copier control call accounting and tele-communications management systems.

**Intec Corp.** — Manufactures the most technologically advanced laser-based inspection and process control systems available to the plastic, steel, paper and other continuous material industries.

**IXYS Corporation** — Develops, manufactures and markets high voltage integrated circuits for the power conversion and motion control markets. These devices combine digital or linear logic with high voltage or high current switching capacity in a hybrid or monolithic package.

**J-TEC Associates, Inc.** — A full service electronics design and manufacturer with capabilities ranging from board design and stuffing to the design and manufacture of integrated circuitry.

**LatroMed Incorporated** — Develops systems and products for tissue growth stimulation through electro-magnetic ion migration.

**Membrex, Inc.** — Produces high performance ultrafiltration membranes.

**Micro Linear Corporation** — Develops linear circuit designs that combine software tools with a full range of process technologies to create a family of customized linear and linear/digital LSI products for systems designers in such fields as data conversion, telecommunications and computer peripherals. Micro Linear also provides custom chip development and manufacturing for the semiconductor industry.

**Micro-Precision Tech, Inc.** — Designer and manufacturer of microelectronic circuits and products.

**Microdynamics, Inc.** — Specializes in microprocessor based production design technology.

**MicroTouch Systems, Inc.** — Manufactures touch-sensitive screens, monitors and peripheral devices for personal computers.

**Netcor, Inc.** — Manufacturer of on-line connectivity systems which interface computer and communications products in enterprise networks.

**Netlink, Inc.** — Manufacturer and distributor of SNA data communications controllers.

**Nonvolatile Electronics, Inc.** — Produces nonvolatile memory device technology products

**Norian Corporation** — Develops bio materials such as unique formulations of calcium phosphate minerals to be used as therapeutic bone substitutes in orthopedic and dental applications.

**Numonics Corporation** — Manufacturer and marketer of electronic and electro- mechanical digitizers and plotters.

**Peak Systems, Inc.** — Produces rapid thermal (chemical vapor) processing systems specifically designed for the high-volume semiconductor manufacturing market as semiconductor geometrics shrink.

**Performance Controls, Inc.** — Designs and manufactures high-performance electronic servo-amplifiers, which provide precise electrical controls used in aerospace, defense, and industrial applications.

**Performance Semiconductor Corporation** — Develops, manufactures and markets high-performance static memories, logic and microprocessor components for the military, computer and telecommunications markets.

**Photometrics, Ltd.** — Manufactures high resolution CCDs, cameras, and digital processing systems serving the scientific and medical diagnostic industries.

**Promega Corporation** — Manufactures molecular biological and probe/diagnostic products.

**Pulse Engineering** — Designs and produces electronic components, including pulse transformers, delay lines, switcher magnetics, filters, and microcircuit subassemblies.

**Rocky Mountain Inst. Co.** — Manufacturer of high-tech optical components, assemblies, and coatings.

**Rugged Digital Systems, Inc.** — Manufactures ruggedized computers for use under severe environmental conditions.

**S.I. Tech** — Manufacturer and marketer of fiber optic modems, multiplexers, and transmitters.

**Suprex Corp.** — Manufactures supercritical fluid chromatography and extraction systems.

**SyQuest Technology** — Manufactures removable Winchester hard disk drives and cartridges.

**TA Instruments, Inc.** — Developer, designer and manufacturer of thermal analysis instruments.

**Tartan Laboratories, Inc.** — Designer and marketer of computer compilers.

**Thermoscan, Inc.** — Developer, manufacturer and distributor of patented infrared tympanic thermometers for measuring human body temperature.

**Topometrix Corporation** — Manufactures advanced scanning probe microscopy for commercial and scientific applications.

**Traveling Software, Inc.** — Designs and manufactures laptop computer software, hardware and related products.

**U.S. Robotics, Inc.** — Manufactures robotics modems.

**Veeco Instruments, Inc.** — Producer of a broad line of quality control test instrumentation for applications in semiconductor production, aerospace and optics manufacturing, material research and high energy physics.

**Vicom Systems, Inc.** — Designs and produces image processing equipment and systems.

**Viewlogic Systems, Inc.** — Develops computer aided engineering software.

**Vivid Technology, Inc.** — Manufactures X-ray security systems to identify plastic explosives and other terrorist devices.

**Voicetek Corporation** — Manufactures interactive voice response computer hardware and software.

**Voxel Corporation** — Produces systems for holographic medical imaging from digital data output of CAT and MRI scans.

**Wavetracer** — Manufacturer of parallel processing super computers.

**Xinix, Inc.** — Manufacturer of sensors and instruments for various thin-film processes.

May, 1993

## Job Creation and SBICs

A fundamental precept of President Clinton's economic recovery program is investment initiatives to create jobs

*"... the only way to lay the foundation for renewed American prosperity is to spur investment. New investment will create jobs, putting people back to work today, and will provide the productive equipment that we need to compete in the global economy."*

President William J. Clinton  
*A Vision of Change for America*  
February 17, 1993

### Introduction

Small businesses have traditionally been the engine of economic growth. These companies comprise over 95% of all businesses in the United States. Small Business Investment Companies (SBICs) provide small businesses with capital, strategic advice and management assistance in order to enable these small companies to grow and to enhance their likelihood of long term success.

The Small Business Investment Company program was established in 1958 to help fill the "equity capital gap", which Congress considered a serious threat to the vitality of our free enterprise economy. This program created a partnership between the federal government and the private sector to substantially improve the flow of long-term, risk capital to small businesses.

Under the program, the U.S. Small Business Administration (SBA) licenses private sector corporations and partnerships to provide financing and management assistance to small businesses in the U.S. Long term debt guaranteed by SBA (leverage) is made available to SBICs to supplement the private capital they raise, increasing the pool of funds SBICs can invest in small business. An SBIC's private capital is exposed to one hundred percent of any potential loss prior to any risk of loss to the federally guaranteed debt.

The SBIC program has been highly successful in meeting its objective of stimulating economic growth and creating jobs over the past three decades. This growth has been accomplished through SBIC investments of \$9.1 billion in over 83,300 small business concerns. These SBIC financings have resulted in the creation of a substantial number of permanent jobs during the 35 year history of the SBIC program at a very low per job cost to the federal government.

## Job Creation by Small Business

Small business is the greatest generator of new jobs in the U.S., and SBIC-backed companies are the most rapidly growing small firms in this sector of the economy.

Historically, the number of new jobs created by small businesses significantly exceeds the number of jobs created by large companies. In normal business cycles, small business creates 60-65% of all the new jobs created in the economy.<sup>1</sup>

Between 1987 and 1992, with the downsizing of many large American businesses, the job creation performance of small business was extraordinary. During this period small growth firms created 5.8 million net new jobs, while big business lost a net of over 2.3 million jobs. In short, over the last six years small business created all of the net new jobs in the U.S. economy.<sup>2</sup>

## Accelerated Job Creation by SBIC-Backed Small Business

Within this context, SBIC-backed small businesses have even greater, proven job creation performance than small businesses generally. A Deloitte, Haskins and Sells (Deloitte & Touche) study<sup>3</sup> concluded that companies financed by SBICs have generated more than ten times the employment growth of all other small businesses. This is a result of the fact that SBICs intentionally invest primarily in startups and other small companies expected to have high growth rates.

Most importantly, the study found that SBIC-backed companies are unusually efficient engines of job creation. One permanent job was created with every \$6,463 of funds invested by an SBIC. Adjusted for inflation, this would translate into one permanent job created for every \$17,000 invested by SBICs today.

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<sup>1</sup> *The State of Small Business: A Report of the President* (1986-90 editions). Other similar studies include: A Federal Trade Commission analysis for the period of 1969 through 1976, showing no new net jobs were created by the Fortune 1,000 companies; and a study by Massachusetts Institute of Technology that showed of 5.6 million companies surveyed two thirds of the net new jobs created between 1969 and 1976 were created by small, growth oriented firms. See also, *The Facts About Small Business*, SBA (April, 1993)

<sup>2</sup> *Who's Creating Jobs?*, Cogentics, Inc. (May, 1993). See also *The State of Small Business: A Report of the President* (1992)

<sup>3</sup> "Summary of the Economic Impact of the Small Business Investment Company Program" by Deloitte Haskins & Sells, 1980. This study surveyed the job growth realized by all companies financed by SBICs from 1958 to 1979 compared to job growth by all small companies as reported by a combination of the Federal Trade Commission Quarterly Report of Manufacturing Companies, U.S. Bureau of Census, and Arthur D. Little, Inc. estimates. In addition to job growth, the study compared the average annual growth of all sales, profits, assets and federal corporate taxes among small businesses to those of SBIC financed businesses. Throughout the period measured, SBIC financed businesses demonstrated a superior growth rate in all categories studies compared to that of all other small businesses.



Support for these conclusions can also be found in a recent economic impact study completed by Coopers & Lybrand for the National Venture Capital Association<sup>4</sup>. The study found that 428 venture capital (and SBIC) financed companies created a net increase of 92,500 highly skilled U.S. jobs between 1985 and 1991, an average of 216 new jobs per company. The average net job growth increase per company was 18% compared to a net decrease of 2% for Fortune 500 companies over the same period.

### Low Government Cost of SBIC Job Creation

Definitive studies have also demonstrated the low governmental cost of creating a permanent job through the SBIC program. The Deloitte & Touche Study concluded that \$17,000<sup>5</sup> invested by an SBIC into a small business creates one permanent new job.

In order to determine the actual direct governmental cost of this new job, it is necessary to compute the government's actual per dollar cost of its share of this \$17,000 investment. Over the past ten years the average outstanding amount of SBA guaranteed leverage was \$847 million. During the same period the average outstanding amount of private capital invested in SBICs totaled \$1.490 billion. The resulting average ratio of SBA guaranteed leverage to private capital is .568 to 1. At this ratio (56.8 cents for every \$1.568 invested), the government share (represented by government guaranteed leverage) of each SBIC dollar invested in a small firm is 36%. Consequently, for each \$17,000 invested by an SBIC to create a job, the government's share ( $\$17,000 \times 36\%$ ) is \$6,120.

Historically, the government's actual cost for each \$1 of SBIC leverage guaranteed by SBA has been 14.29 cents (or 14.29%)<sup>6</sup>. Therefore, the government's \$6,120 share of the amount an SBIC invests to create a job multiplied by the government's per dollar cost of 14.29% produces a historical government cost to create a new job through the SBIC program of \$875 per job. This level of cost is significantly below the published per job cost of most other job creation programs sponsored by the Federal government.

<sup>4</sup> "Third Annual Economic Impact of Venture Capital Study" by Coopers and Lybrand and Venture Economics.

<sup>5</sup> \$6,463 cost per job in 1980 adjusted for inflation to the present.

<sup>6</sup> Office of Management and Budget (OMB) budget scoring model for the SBIC program, 1992.

## Recent Evidence of Low-Cost Job Creation by SBICs

A recent study of a representative group of SBIC portfolio company investments confirmed the remarkable job creation capacity of SBIC investments in small growth firms.<sup>7</sup> The study covered SBIC investments of \$544 million in 442 small growth firms over the last ten years.

During this period, these small businesses created a net increase of 49,678 new jobs for the U.S. economy. The creation of each new job, therefore, involved an SBIC investment of only \$11,000. (While this is substantially less than the \$17,000 investment per job used in the above analysis, we have chosen to use the more conservative figure to compute the government cost per job.)

## An Efficient, High-Visibility Investment Initiative

In today's environment of budget deficits government investment initiatives designed to create jobs must be highly efficient and produce the greatest numbers of permanent jobs at the lowest cost.

The SBIC program has a thirty-five year history of creating permanent jobs at extraordinarily low cost to the government. Despite the compelling low cost job creation success of the SBIC program, utilization of the SBIC program was deemphasized substantially during the past ten years. The number of operating SBICs was also sharply reduced during this period.

In order to revitalize the SBIC program and thereby benefit from this efficient engine of job growth, Congress passed legislation in late 1992 to restructure and improve the program (the Small Business Equity Enhancement Act of 1992, P.L.102-366). With the regulations governing this exciting new program nearly complete, numerous institutional and other private investors are poised to invest millions of dollars into new SBICs.

The new SBIC program can be a fresh, high-visibility initiative to showcase President Clinton's commitment to small business, job creation and investment in America's future growth.

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<sup>7</sup> NASBIC survey of thirteen randomly selected SBICs of different sizes, from various geographic locations and having different investment strategies (May, 1993).

## Conclusion

The SBIC program alone can go a long way to help the President meet his job creation goals. And, it can be launched with a modest investment of government funds.

Appropriations of only \$354-million over five years would fully fund the entire \$3.0-billion in SBIC guarantees authorized by Congress. Based on the proven job generation capability of the SBIC program, this level of funding would ultimately create over 350,000 permanent new jobs.

For FY 1994, the SBIC industry is requesting an appropriation of \$36.4 million.<sup>8</sup> This level of funding will create 25,000 new jobs, and it represents a modest increase of \$10.6-million over the Administration's request for SBIC funding.

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<sup>8</sup> \$21-million to support SBA guarantees for \$150-million of participating securities at a subsidy rate of 14%; and \$15.4-million to support SBA guarantees of \$100-million for current pay debentures at a subsidy rate of 15.4%.

**BENEFITS PRODUCED BY THE SBIC PROGRAM**  
NASBIC Portfolio Company Data Base

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COMPANY	YEAR SBIC INVESTED	NUMBER OF EMPLOYEES When SBIC Invested	1990	SALES (000s) When SBIC Invested	1990	AFTER TAX PROFITS (000s) When SBIC Invested	1990	CUM. FEDERAL TAXES PAID (000s)
ACTION AUTO RENTAL INC.	1984	4	1,199	\$ 456	\$ 98,466	\$ (8)	\$ 5,572	\$ 9,796
APPLE COMPUTER INC.	1977	63	14,500	773	5,284,013	42	454,033	1,232,010
BEAUTICONTROL COSMETICS	1986	131	300	9,524	52,786	1,364	6,060	10,927
CALLAWAY GOLF CO.	1985	29	200	1,974	20,500	(1,009)	2,450	621
COMPAQ COMPUTER CORP.	1983	155	9,700	257	3,600,000	(4,649)	430,000	588,600
COSTCO WHOLESALE INC.	1983	5	9,500	0	4,132,800	0	49,200	45,000
CRAY RESEARCH INC.	1972	12	4,708	58	784,700	(3)	89,045	445,410
ENCLEAN INC.	1985	53	1,177	1,700	52,669	(273)	2,097	2,168
FEDERAL EXPRESS CORP.	1973	518	64,700	8,769	7,015,069	(4,480)	115,764	748,360
FILENET CORP.	1982	25	653	\$112	83,100	(262)	2,950	5,000
INTEL CORP.	1969	218	21,700	565	3,126,833	(1,897)	391,021	787,260
LANDMARK GRAPHICS INC.	1984	16	500	31	56,707	(609)	5,833	8,072
MICROTEK MEDICAL INC.	1984	100	267	2,438	15,270	637	767	1,417
NETWORK SYSTEMS CORP.	1978	35	1,090	3	144,789	(638)	17,327	59,990
PAGING NETWORK INC.	1981	212	1,280	16,000	107,000	(2,000)	(13,604)	1,000
PRO-NET INC.	1983	7	225	125	15,000	(175)	400	350
RAILTEX INC.	1980	7	200	700	21,500	(17)	1,500	3,700
RAMSAY HEALTH CARE	1983	1	2,071	0	116,000	0	5,800	10,000
SHOREWOOD PACKAGING CORP.	1985	430	750	43,360	127,136	3,049	15,000	22,304
STAPLES, INC.	1988	44	1,700	79	310,000	(893)	5,500	6,200
SYMBOL TECHNOLOGIES INC.	1976	4	1,800	0	222,346	0	18,968	30,100
TELEPHONE ELECTRONICS	1977	105	850	2,787	66,453	400	1,222	6,655
THE WHOLESALE CLUB	1984	159	2,782	11,600	569,665	(1,136)	6,148	1,720
UNIVERSAL HEALTH SERVICES	1979	140	10,200	20	587,000	(40)	9,000	7,500
VERTEX COMMUNICATIONS	1985	175	375	16,217	37,502	(464)	1,945	2,855
		2,648	152,207	\$ 115,548	\$ 26,647,104	(\$ 13,731)	\$ 1,651,246	\$4,037,015

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ISBN 0-16-044321-0



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